

20.62
A51
C.2p

Army

Engineering
Library

SEP 24 1916
UNIV OF MICH

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

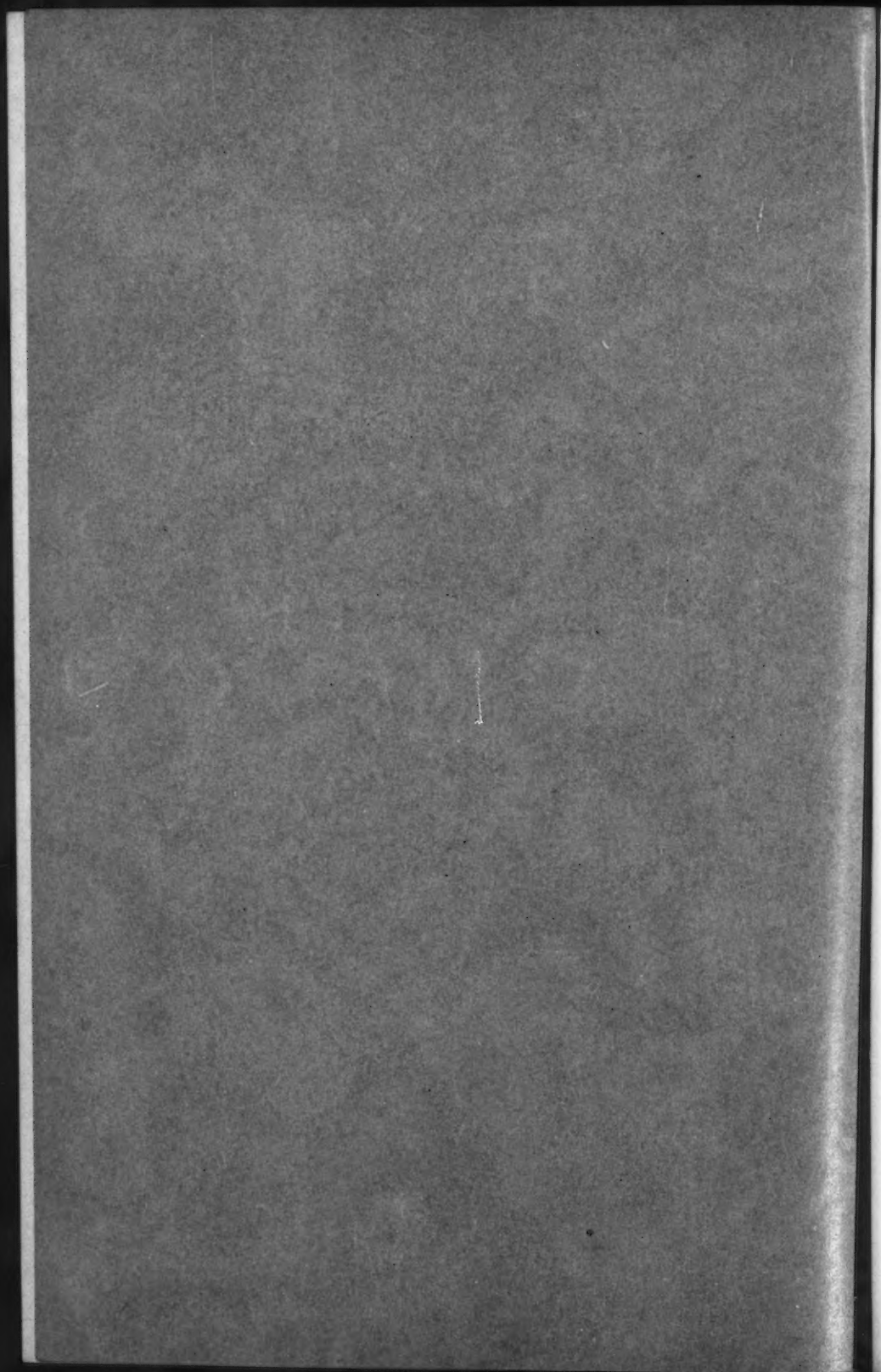
VOL. XLII—No. 7



September, 1916

Published at the House of the Society, 230 West Fifty-seventh Street, New York,
the Fourth Wednesday of each Month, except June and July.

Copyrighted 1916, by the American Society of Civil Engineers.
Entered as Second-Class Matter at the New York City Post Office, December 15th, 1896.
Subscription, \$8 per annum.



AMERICAN SOCIETY

CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XLII—No. 7

SEPTEMBER, 1916

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that the full title of Paper, name of Author, page reference, and date of presentation to the Society, are given.

CONTENTS

Society Affairs.....Pages 591 to 644

Papers and Discussions Pages 1219 to 1314

NEW YORK 1916

Entered according to Act of Congress, in the year 1916, by the AMERICAN SOCIETY OF
CIVIL ENGINEERS, in the office of the Librarian of Congress, at Washington.

American Society of Civil Engineers

OFFICERS FOR 1916

President, CLEMENS HERSCHEL

Vice-Presidents

Term expires January, 1917:

DANIEL BONTECOU
RICHARD MONTFORT

Term expires January, 1918:

ALFRED CRAVEN
PALMER C. RICKETTS

Secretary, CHARLES WARREN HUNT

Treasurer, LINCOLN BUSH

Directors

Term expires January,
1917:

GEORGE W. FULLER
ARTHUR S. TUTTLE
CHARLES H. KEEFER
MORTIMER E. COOLEY
EUGENE E. HASKELL
ISHAM RANDOLPH

Term expires January,
1918:

JOHN V. DAVIES
GEORGE A. HARWOOD
JOHN E. GREINER
JOHN F. COLEMAN
JOHN B. HAWLEY
HERBERT S. CROCKER

Term expires January,
1919:

VIRGIL G. BOGUE
ALEX. C. HUMPHREYS
OTIS F. CLAPP
RICHARD KHUEN
FRANK G. JONAH
EDWIN DURYEA, JR.

Assistant Secretary, T. J. MCMINN

Standing Committees

(THE PRESIDENT OF THE SOCIETY IS *ex-officio* MEMBER OF ALL COMMITTEES)

On Finance:

GEORGE W. FULLER
ALFRED CRAVEN
VIRGIL G. BOGUE
OTIS F. CLAPP
FRANK G. JONAH

On Publications:

ARTHUR S. TUTTLE
VIRGIL G. BOGUE
ALEX. C. HUMPHREYS
JOHN E. GREINER
JOHN F. COLEMAN

On Library:

GEORGE A. HARWOOD
JOHN V. DAVIES
HERBERT S. CROCKER
MORTIMER E. COOLEY
CHAS. WARREN HUNT

Special Committees

ON CONCRETE AND REINFORCED CONCRETE: Joseph R. Worcester, J. E. Greiner, W. K. Hatt, Olaf Hoff, Richard L. Humphrey, Robert W. Lesley, Emil Swensson, A. N. Talbot.

ON ENGINEERING EDUCATION: Desmond FitzGerald, Onward Bates, D. W. Mead.

ON STEEL COLUMNS AND STRUTS: George H. Pegram, James H. Edwards, Clarence W. Hudson, Charles F. Loweth, Rudolph P. Miller, Ralph Modjeski, Frank C. Osborn, Lewis D. Rights, George F. Swain, Emil Swensson, Joseph R. Worcester.

ON MATERIALS FOR ROAD CONSTRUCTION: W. W. Crosby, A. W. Dean, H. K. Bishop, A. H. Blanchard, George W. Tillson, Nelson P. Lewis, Charles J. Tilden.

ON VALUATION OF PUBLIC UTILITIES: Frederic P. Stearns, Charles S. Churchill, Leonard Metcalf, William G. Raymond, Henry E. Riggs, Jonathan P. Snow, William J. Wilgus.

TO INVESTIGATE CONDITIONS OF EMPLOYMENT OF, AND COMPENSATION OF, CIVIL ENGINEERS: Nelson P. Lewis, S. L. F. Deyo, Dugald C. Jackson, William V. Judson, George W. Tillson, C. F. Loweth, John A. Bensel.

TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, Edwin Duryea, Jr., E. G. Haines, Allen Hazen, James C. Meem, Walter J. Douglas.

ON A NATIONAL WATER LAW: F. H. Newell, W. C. Hoad, John H. Lewis.

TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, J. B. Berry, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Robert W. Hunt, George W. Kittredge, Paul M. LaBach, C. G. E. Larsson, G. J. Ray, Albert F. Reichmann, H. R. Safford, F. E. Turneure, J. E. Willoughby.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER.....1446 Circle.

CABLE ADDRESS....."Ceas, New York."

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

CONTENTS

	PAGE
Minutes of Meetings:	
Of the Society, September 6th, 1916.....	591
Of the Board of Direction, September 12th, 1916.....	592
Announcements:	
Hours during which the Society House is open.....	593
Future Meetings.....	593
Searches in the Library.....	593
Papers and Discussions.....	594
Local Associations of Members of the American Society of Civil Engineers.....	594
Minutes of Meetings of Special Committees.....	599
Privileges of Engineering Societies Extended to Members.....	600
Accessions to the Library:	
Donations.....	603
By purchase.....	607
Membership (Additions, Changes of Address, Deaths).....	608
Recent Engineering Articles of Interest.....	616

MINUTES OF MEETINGS

OF THE SOCIETY

September 6th, 1916.—The meeting was called to order at 8.30 P. M.; T. Kennard Thomson, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present; also, 85 members and 8 guests. The minutes of the meetings of May 17th, May 24th, June 7th, and of the Annual Convention (June 27th, 1916), were approved as printed in *Proceedings* for August, 1916.

A paper by J. C. Allison, Assoc. M. Am. Soc. C. E., entitled "Control of the Colorado River as Related to the Protection of Imperial Valley" was presented by the Secretary who also read communications on the subject from Messrs. A. L. Sonderegger and J. A. Ockerson.

The Secretary announced the following deaths:

DON JUAN WHITEMORE (*Past-President*), of Milwaukee, Wis., elected Member, July 10th, 1872; Honorary Member, January 6th, 1911; died July 16th, 1916.

THOMAS APPLETON, of Gardiner, Me., elected Member, April 4th, 1883; died August 3d, 1916.

MIGUEL DE TEIVE E ARGOLLO, of London, England, elected Member, October 2d, 1895; died May 14th, 1916.

EDWARD CANFIELD, of Middletown, N. Y., elected Member, December 3d, 1879; died August 18th, 1916.

HENRY ARTHUR HALL, of Sumner, Wash., elected Member, May 7th, 1902; died June 6th, 1916.

ARTHUR HIDER, of Greenville, Miss., elected Member, September 7th, 1881; date of death unknown.

JOSEPH OTIS OSGOOD, of New York City, elected Junior, May 3d, 1876; Member, March 5th, 1879; died June 28th, 1916.

WILLIAM RODNEY PATTERSON, of Chicago, Ill., elected Member, May 4th, 1909; died July 20th, 1916.

ERNEST FREDERICK TABOR, of St. Ignatius, Mont., elected Member, May 1st, 1907; died August 20th, 1916.

FRANK JOSEPH CONLON, of Brooklyn, N. Y., elected Associate Member, March 2d, 1915; died June 28th, 1916.

STANLEY HASTINGS McMULLEN, of Jeffersonville, Ind., elected Associate Member, November 3d, 1915; died July 12th, 1916.

ROY KARL SCHLAFLY, of Columbus, Ohio, elected Associate Member, September 3d, 1913; date of death unknown.

Adjourned.

OF THE BOARD OF DIRECTION

(Abstract)

September 12th, 1916.—The Board met at 10.30 P. M.; Vice-President Craven in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bush, Davies, Endicott, Harwood, and Tuttle.

Ballots for Membership were canvassed, resulting in the election of 19 Members, 50 Associate Members, 5 Associates, and 19 Juniors, and the transfer of 25 Juniors to the grade of Associate Member.

Nine Associate Members were transferred to the grade of Member.

A Report from the Membership Committee was received and acted upon.

Adjourned.

ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

October 4th, 1916.—8.30 P. M.—This will be a regular business meeting. A paper by H. de B. Parsons, M. Am. Soc. C. E., entitled "Underpinning Trinity Vestry Building for Subway Construction", will be presented for discussion.

This paper was printed in *Proceedings* for August, 1916.

October 18th, 1916.—8.30 P. M.—At this meeting a paper by J. B. Lippincott, M. Am. Soc. C. E., entitled "A Method of Determining a Reasonable Service Rate for Municipally Owned Public Utilities", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

November 1st, 1916.—8.30 P. M.—A regular business meeting will be held, and a paper by F. H. Peters, Assoc. M. Am. Soc. C. E., entitled "A Complete Method for the Classification of Irrigable Lands", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

It sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the material may be reproduced by photography, and this can be done for members at the cost of the work to the Society, which

is small. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which, from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association, Organized 1905.

President, H. L. Haehl; Secretary, E. T. Thurston, 57 Post Street, San Francisco, Cal.

The San Francisco Association of Members of the American Society of Civil Engineers holds regular, bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the Palace Hotel, on the third Tuesday of February, April, June, August, and October, and the third Friday of December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M., every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary.

(Abstract of Minutes of Meeting)

August 15th, 1916.—The meeting was called to order at the Palace Hotel; President H. L. Haehl in the chair; E. T. Thurston, Secretary; and present, also, 74 members and guests.

The guests of the Association at this meeting were Wilbur J. Watson, M. Am. Soc. C. E., and Mr. Harlan D. Miller, of Cleveland, Ohio, E. E. Howard, M. Am. Soc. C. E., of Kansas City, Mo., and Charles Evan Fowler, M. Am. Soc. C. E., of Seattle, Wash.

The Secretary read a preliminary report of the Committee appointed to consider the suggestions contained in President Haebl's Inaugural Address on "The Growth in Power and Usefulness of the Association". In view of the fact that the proposed amendments to the Constitution of the Society will greatly affect this problem, the Committee recommended that the matter be held in abeyance pending final action on the amendments.

Messrs. Cattell, Duryea, and Couchot, a committee appointed to attend the public hearing before a Board of United States Army Engineers, in the matter of the San Francisco-Oakland Bridge, reported that plans for such a bridge had been submitted by Messrs. Wilbur J. Watson and Harlan D. Miller, and by Mr. Charles Evan Fowler, and as these gentlemen were present at the meeting, suggested that they be called on to speak.

Brief addresses were made by Messrs. Watson, Miller, Howard, and Fowler, and Mr. Fowler showed stereopticon views of bridge structures, illustrating the evolution of bridges and exhibiting interesting details of modern bridge construction.

The entertainment provided by the Committee consisted of a male quartet from the University of California. President Haebl appointed Messrs. Charles Gilman Hyde, F. S. Foote, Jr., and B. A. Etcheverry, as the Entertainment Committee for the October meeting.

A paper on "The Proper Relation of Responsibility and Authority" was presented by Mr. George L. Dillman, but, owing to the lateness of the hour, on motion, duly seconded, discussion thereon was postponed until some future meeting.

Adjourned.

Colorado Association, Organized 1908.

President, Thomas W. Jaycox; Secretary-Treasurer, L. R. Hinman, 1400 West Colfax Avenue, Denver, Colo.

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays at 12.30 p. m., at Daniels & Fisher's.

Visiting members are urged to attend the meetings and luncheons.

Atlanta Association, Organized 1912.

President, Paul H. Norcross; Secretary-Treasurer, Thomas P. Branch, Georgia School of Technology, Atlanta, Ga.

The Association holds its meetings at the University Club, Atlanta, Ga. Regular monthly luncheon meetings are held to which visiting members of the Society are always welcome.

Baltimore Association, Organized 1914.

President, H. D. Bush; Secretary-Treasurer, Charles J. Tilden, The Johns Hopkins University, Baltimore, Md.

Cleveland Association, Organized 1914.

President, Robert Hoffmann; Secretary-Treasurer, George H. Tinker, Hickox Building, Cleveland, Ohio.

District of Columbia Association, Organized 1916.

President, A. P. Davis; Secretary-Treasurer, John C. Hoyt, U. S. Geological Survey, Washington, D. C.

Illinois Association, Organized 1916.

President, Onward Bates; Secretary-Treasurer, E. N. Layfield, 4251 Vincennes Avenue, Chicago, Ill.

The regular meetings of the Association are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Louisiana Association, Organized 1914.

President, W. B. Gregory; Secretary, E. H. Coleman, 920 Hibernia Building, New Orleans, La.

Northwestern Association, Organized 1914.

President, W. L. Darling; Secretary, Ralph D. Thomas, Minneapolis, Minn.

Philadelphia Association, Organized 1913.

President, Edward B. Temple; Secretary, W. L. Stevenson, 412 City Hall, Philadelphia, Pa.

The regular meetings of the Association are held at the Engineers' Club of Philadelphia, 1317 Spruce Street, on the first Monday in January, April, and October, the last being the Annual Meeting.

Portland, Ore., Association, Organized 1913.

President, J. P. Newell; Secretary, J. A. Currey, 194 North 13th Street, Portland, Ore.

St. Louis Association, Organized 1914.

President, J. A. Ockerson; Secretary-Treasurer, Gurdon G. Black, 34 East Grand Avenue, St. Louis, Mo.

The meetings of the Association are held at the Engineers' Club Auditorium. The Annual Meeting is held on the fourth Monday in November. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

San Diego Association, Organized 1915.

President, George Butler; Secretary-Treasurer, J. R. Comly, 4105 Falcon Street, San Diego, Cal.

Seattle Association, Organized 1913.

President, A. O. Powell; Secretary-Treasurer, Carl H. Reeves, 4722 Latona Avenue, Seattle, Wash.

The regular meetings of the Association are held at 12.15 P. M., on the last Monday of each month, at The Northold Inn, 212 University Street.

(Abstract of Minutes of Meetings)

July 31st, 1916.—The meeting was called to order at 12.15 P. M., at The Northold Inn; President A. O. Powell in the chair; Carl H. Reeves, Secretary; and present, also, 16 members and guests.

The minutes of the meeting of June 26th, 1916, were read and approved.

The President announced that he had appointed Messrs. Henry L. Gray, Chairman, T. A. Noble, and Paul P. Whitham, as delegates to the Water Code Conference which was held in Tacoma, Wash., on July 11th-12th, 1916.

Mr. A. Münster, Chairman of the Soils Committee, reported on the work and meetings of that Committee.

In the absence of Mr. Gray, a brief report on the work of the Water Code Conference was presented by Mr. Noble, in which he stated that a Conference Committee of seven had been appointed to compile suggestions received relative to the Water Code and to draw up a bill to be submitted to a general meeting of the Conference to be held in North Yakima in November.

The President called the attention of the meeting to the fact that the Conference Committee was composed of three lawyers, three engineers, and one business man, and that of the three engineers, all of whom were members of the Society, two were also members of the Association.

Mr. Bertram D. Dean, representing the Association on the Creosoted Timbers Committee, presented a progress report of the work of that Committee.

The resignation of Mr. Arthur T. Nelson, as a member of the Association, on account of removal from the city, was read and accepted.

A discussion of the relations between the National Engineering Societies and the Local Associations of their members, which had been set down for this meeting, was opened by Mr. Ernest B. Hussey, and the subject was also discussed by Messrs. Fuller, Noble, Powell, and Reeves.

On motion, duly seconded, it was decided to appoint a committee to report on this subject as discussed and printed on page 317, *et seq.*, of the May, 1916, *Proceedings* of the Society.

Mr. A. D. Butler, Secretary of the Spokane Association, addressed the meeting, referring briefly to the relationship between the various technical associations of Spokane and the National Societies, and also to the proposed Water Code of the State of Washington.

Adjourned.

August 28th, 1916.—The meeting was called to order at 12.15 P. M., at The Northold Inn; President A. O. Powell in the chair; Carl H. Reeves, Secretary; and present, also, 15 members and guests.

The minutes of the meeting of July 31st, 1916, were read and, after slight correction, approved.

The President announced that, in accordance with the action of the Association at its meeting of July 31st, 1916, he had appointed Messrs. A. H. Fuller, E. B. Hussey, and Joseph Jacobs as a committee to report on the subject-matter covered on page 317 *et seq.*, of the May, 1916, *Proceedings* of the Society, namely, the relations existing between National Engineering Societies and local associations of their members.

On motion, duly seconded, Messrs. H. F. Flynn and P. A. Franklin were appointed as additional members of this Committee.

Mr. C. C. Moore was appointed to fill the vacancy on the Soils Committee caused by the removal of Mr. J. R. West to China.

The question of a change in the place for holding the regular monthly meetings and luncheons was discussed, and the Secretary-Treasurer was instructed to see what other arrangements could be made and to act with President Powell in making a selection.

Mr. Henry L. Gray, Chairman of the Water Code Conference Committee, presented his report in a letter to the President. After discussion by Messrs. Hussey, Powell, Gray, Jacobs, and Dean, on motion, duly seconded, the letter report was accepted and placed on file, and the Committee was instructed to amend the present Water Code Bill to cover the ideas set forth in the Report and the suggestions made by the members who discussed it.

On motion, duly seconded, the question of co-operation with the local architects in re a licensing bill to be presented to the next Legislature, was referred to the Legislative Committee.

Adjourned.

Southern California Association, Organized 1914.

President William Mulholland; Secretary, W. K. Barnard, 701 Central Building, Los Angeles, Cal.

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bi-monthly meetings, with banquet, at Hotel Clark, on the second Wednesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 p. m. every Wednesday, and the place of meeting may be ascertained from the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

(Abstract of Minutes of Meeting)

July 12th, 1916.—The meeting was called to order at the Hotel Clark, at 6.45 p. m.; Vice-President Louis C. Hill in the chair; F. G. Dessery, Temporary Secretary, acting as Secretary.

The minutes of the meetings of the Association, of April 8th, 1916, and of the Board of Directors, of May 12th, 1916, were read and approved.

The Secretary read a letter from F. H. Newell, M. Am. Soc. C. E., addressed to Mr. J. B. Lippincott, relative to a "Federal Water Law". The subject was discussed by Mr. Hill, and it was suggested that a committee be appointed to co-operate in the matter. President Mulholland appointed Messrs. Hill, Hawgood, and Quinton, as such Committee.

A paper by Mr. J. C. Allison, entitled "Control of the Colorado River as Related to the Protection of Imperial Valley", was presented by the author, and the subject was discussed by Messrs. Hill, Binckley, Smith, Olberg, Dennis, and Moody.

Mr. Harold Fisk Holley was admitted as a Member of the Association.

On motion, duly seconded, the following resolution was adopted unanimously:

"Whereas, It is the duty of every patriotic engineer to prepare himself to be of the greatest service to his country in time of need; and

"Whereas, The Engineering Corps of California is striving to effect this object; therefore be it

"Resolved, by the Southern California Association of Members of the American Society of Civil Engineers, that we heartily endorse the purposes of the California Corps of Engineers."

Mr. Binckley, of the Meteorological Committee, reported progress.

On motion, duly seconded, a vote of thanks was given Mr. Allison for his instructive paper.

Adjourned.

Spokane Association, Organized 1914.

President, Ulysses B. Hough; Secretary, A. D. Butler, Spokane, Wash.

Texas Association, Organized 1913.

President, John B. Hawley; Secretary, J. F. Witt, Dallas, Tex.

Utah Association, Organized 1916.

President, E. C. La Rue; Secretary-Treasurer, H. S. Kleinschmidt, 306 Dooley Building, Salt Lake City, Utah.

MINUTES OF MEETINGS OF

SPECIAL COMMITTEES

TO REPORT UPON ENGINEERING SUBJECTS

Special Committee on Steel Columns and Struts

June 28th, 1916.—The meeting was called to order at 12 m., on the Steamer *Sunshine* during the trip down the Monongahela River, at the Annual Convention, Pittsburgh, Pa. Present, George H. Pegram (Chairman), Charles F. Loweth, George F. Swain, and Lewis D. Rights (Secretary). Dr. G. R. Olshausen, of the Bureau of Standards, was also present.

The minutes of the meeting of April 6th, 1916, were approved as written.

For the Committee on Initial Sets, Dr. Olshausen reported progress. Attention was called to the discussion before the Annual Meeting of the American Society for Testing Materials on the relation between yield point, elastic limit, and proportional limit. Dr. Olshausen stated that he had submitted a discussion on these subjects to that Society, and agreed to send copies of his discussion to the members of the committee, together with a report on the same subjects which he had recently made to other departments of the United States Government. The Committee was continued.

Dr. Olshausen reported that the Bureau of Standards had not had an opportunity to make the necessary experiments preliminary to proceeding with the transverse tests.

On motion, duly seconded, the matter of special grades of steel and the question of heat treatment were left open, to be considered in connection with a subsequent programme.

After adjourning at 1 P. M. for luncheon, the meeting was called to order at 2 P. M.

After considerable discussion, on motion, duly seconded, the Chairman and Secretary were ordered to prepare an abstract of all the discussions which have been received on Safe Working Stresses and to submit it to the members of the Committee. Mr. J. R. Worcester will be requested to submit his closing discussion at a subsequent meeting.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

American Institute of Electrical Engineers, 33 West Thirty-ninth Street, New York City.

American Institute of Mining Engineers, 29 West Thirty-ninth Street, New York City.

American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York City.

Architekten-Verein zu Berlin, Wilhelmstrasse 92, Berlin W. 66, Germany.

Associação dos Engenheiros Cívis Portuguezes, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 176 Mansfield Street, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, St. Paul, Minn.

- Cleveland Engineering Society**, Chamber of Commerce Building, Cleveland, Ohio.
- Cleveland Institute of Engineers**, Middlesbrough, England.
- Dansk Ingeniorforening**, Amaliegade 38, Copenhagen, Denmark.
- Detroit Engineering Society**, 46 Grand River Avenue, West, Detroit, Mich.
- Engineers and Architects Club of Louisville**, 1412 Starks Building, Louisville, Ky.
- Engineers' Club of Baltimore**, 6 West Eager Street, Baltimore, Md.
- Engineers' Club of Kansas City**, E. B. Murray, Secretary, 920 Walnut Street, Kansas City, Mo.
- Engineers' Club of Minneapolis**, 17 South Sixth Street, Minneapolis, Minn.
- Engineers' Club of Philadelphia**, 1317 Spruce Street, Philadelphia, Pa.
- Engineers' Club of St. Louis**, 3817 Olive Street, St. Louis, Mo.
- Engineers' Club of Toronto**, 96 King Street, West, Toronto, Ont., Canada.
- Engineers' Club of Trenton**, Trent Theatre Building, 12 North Warren Street, Trenton, N. J.
- Engineers' Society of Northeastern Pennsylvania**, 415 Washington Avenue, Scranton, Pa.
- Engineers' Society of Pennsylvania**, 31 South Front Street, Harrisburg, Pa.
- Engineers' Society of Western Pennsylvania**, 2511 Oliver Building, Pittsburgh, Pa.
- Institute of Marine Engineers**, The Minories, Tower Hill, London, E., England.
- Institution of Engineers of the River Plate**, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.
- Institution of Naval Architects**, 5 Adelphi Terrace, London, W. C., England.
- Junior Institution of Engineers**, 39 Victoria Street, Westminster, S. W., London, England.
- Koninklijk Instituut van Ingenieurs**, The Hague, The Netherlands.
- Louisiana Engineering Society**, State Museum Building, Chartres and St. Ann Streets, New Orleans, La.
- Memphis Engineers' Club**, Memphis, Tenn.
- Midland Institute of Mining, Civil and Mechanical Engineers**, Sheffield, England.
- Montana Society of Engineers**, Butte, Mont.
- North of England Institute of Mining and Mechanical Engineers**, Newcastle-upon-Tyne, England.
- Oesterreichischer Ingenieur- und Architekten-Verein**, Eschenbachgasse 9, Vienna, Austria.
- Oregon Society of Civil Engineers**, Portland, Ore.

Pacific Northwest Society of Engineers, 312 Central Building, Seattle, Wash.

Rochester Engineering Society, Rochester, N. Y.

Sachsischer Ingenieur- und Architekten-Verein, Dresden, Germany.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingenieurs Civils de France, 19 rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Svenska Teknologforeningen, Brunkebergstorg 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18-1, Copenhagen, Denmark.

Vermont Society of Engineers, George A. Reed, Secretary, Montpelier, Vt.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

ACCESSIONS TO THE LIBRARY

(From August 2d to September 5th, 1916)

DONATIONS*

WATER WORKS HANDBOOK

Compiled by Alfred Douglas Flinn and Robert Spurr Weston, Members, Am. Soc. C. E., and Clinton Lathrop Bogert, Assoc. M. Am. Soc. C. E. Cloth, $9\frac{1}{2} \times 6\frac{1}{2}$ in., illus., 9 + 824 pp. New York, McGraw-Hill Book Company, Inc.; London, Hill Publishing Co., Ltd., 1916. \$6.00.

This book gives, the preface states, a usable compilation of information, old and new, on hydraulics and water supplies, for the water-works engineer and superintendent, the designer, constructor, operator, and inspector. The subject-matter, which has been accumulated by the compilers in the course of their practice in the various branches of water-works engineering, is arranged by grouping the contents under the natural topics, each topic being subdivided and its divisions arranged sequentially. All matter not readily classified is arranged under the heading, Miscellaneous. The user is assumed to be familiar with mathematics, hydraulics, the natural sciences, and water-works construction, operation and maintenance, and to possess ordinary mathematical tables. Instead of rules or formulas, data have been given, in some cases, from which the engineer can make his own determinations in accordance with local conditions, etc. Descriptions of materials, apparatus, equipment, methods, formulas, and business concerns are included, but mention of them, it is stated, does not necessarily imply approval by the compilers. The specifications included have been stripped, it is said, of useless non-technical matter and words, in order that the user may amplify and arrange his own materials in proper form when preparing a contract. The Contents are: Part I, Sources of Water Supply; Part II, Collection of Water; Part III, Transportation and Delivery of Water; Part IV, Distribution of Water; Part V, Character and Treatment of Water; Index.

MOSQUITO CONTROL IN PANAMA:

The Eradication of Malaria and Yellow Fever in Cuba and Panama. By Joseph A. Le Prince and A. J. Orenstein. With an Introduction by L. O. Howard. Cloth, $8\frac{1}{2} \times 6\frac{1}{2}$ in., illus., 17 + 335 pp. New York and London, G. P. Putnam's Sons, 1916. \$2.50.

One of the authors, Mr. Le Prince, was with General Gorgas, as his Chief Assistant, during the health campaign against malaria and yellow fever in Cuba. When General Gorgas was sent to the Canal Zone by the Isthmian Canal Commission, Mr. Le Prince went with him, and this book contains a carefully prepared, detailed record of how both places were cleared of mosquitoes, and consequently of malaria and yellow fever, the study made of their habits, etc., the methods used to eradicate them and protect the people from their bite, the system of inspection installed, etc., etc. The work of these men has been an object lesson for sanitarians all over the world, and has demonstrated, it is stated, that it is possible for the white man to live healthfully in the tropics. This record of their work, therefore, should prove of great practical importance as a guide in future work of the same character, especially in the tropics, as well as of permanent historic value of work already accomplished. The Contents are: Part I, Anti-Malaria Campaign: The Status of Knowledge of Anti-Malaria Work in 1904 and the Previous Campaign in Havana; The Situation on the Isthmus in 1904, Before American Occupation; Meteorological and Topographical Conditions; The Species of Anopheles on the Isthmus; Anopheles Propagation Areas; Harboring Places and Food of Anopheles; Flight and Attraction of Mosquitoes; Attack on Propagation Areas by Filling; By Drainage; By Oiling; By Larvicides; By Natural Enemies; By Clearing Bodies of Water; By Removal of Jungle; Screening and Practical Destruction of Adult Anopheles in Houses; The Results Accomplished by the Anti-Malaria Campaign. Part II, The Yellow Fever Campaign: The Campaign in Havana; The Situation on the Isthmus before Sanitary Work was Started; Geography, Meteorology, etc., and Their Bearing on the Presence of Aedes Culex; The First Sanitary Work Done in Panama; The Anti-Yellow Fever Campaign and Its Results; Measures Taken to Keep the Isthmus Free from Yellow Fever; The Value of Yellow Fever Eradication in the Construction of the Panama Canal; Index.

* Unless otherwise specified, books in this list have been donated by the publishers.

HANDBOOK FOR HIGHWAY ENGINEERS:

Part I, Principles of Design; Part II, Practice of Design and Construction. By Wilson G. Harger, Assoc. M. Am. Soc. C. E., and Edmund A. Bonney. Second Edition, Entirely Revised and Enlarged. Morocco, 7 x 4½ in., illus., 16 + 609 pp. New York, McGraw-Hill Book Company, Inc.; London, Hill Publishing Co., Ltd., 1916. \$3.00.

In the preface to the first edition, issued in 1912, and in the secondary title, it is stated that the purpose of this book is to collect, in a compact and convenient form, information ordinarily used in the design and construction of roads warranting an expenditure of from \$5 000 to \$30 000 per mile. The book, it is said, has been designed to meet the requirements of both experienced and inexperienced road men, and the collection of cost data and the tables, it is hoped, will prove useful to all who are engaged in road work. Considerable progress has been made in the practice of road design and construction since the publication of the first edition of this work, and this has necessitated a thorough revision of the subject-matter. The authors, therefore, have brought the material on top courses up to date and have added, it is stated, considerable data on tests, designs, costs, maintenance, and specifications, as well as approximately 100 pages of new matter, and a more complete and systematic index. The Contents are: Part I, Principles of Design: Grades and Alignment; Sections; Drainage; Foundations for Broken Stone Roads; Top Courses and Their Maintenance; Minor Points; Materials. Part II, Practice of Design and Construction: The Survey; Office Practice; Cost Data and Estimates; Notes on Construction; Specifications; Tables; Appendix A, Traffic Rules and Regulations of the State of Ohio; Traffic Regulations, State of New York; Index.

THE CONSTRUCTION OF ROADS AND PAVEMENTS.

By T. R. Agg. Cloth, 9½ x 6½ in., illus., 7 + 432 pp. New York, McGraw-Hill Book Company, Inc.; London, Hill Publishing Co., Ltd., 1916. \$3.00.

This book was written, the preface states, to meet the need for a concise presentation of approved practice in the construction of roads and pavements and of the principles involved therein. It is intended primarily for use as a textbook by engineering students in a 2- or 3-hour course in highway engineering. The author, however, has also included typical designs and specifications, processes of selecting, testing, and mixing materials, descriptions of plant used, methods of construction, results of traffic, etc., as well as numerous tables and examples of practice in the different States, which, it is said, should make it valuable as a reference book for highway engineers. The Chapter headings are: The Development of Highway Systems; Surveys and Plans for Roads and Pavements; The Design of Rural Highways; The Construction and Maintenance of Earth Roads; Testing Non-Bituminous Road Materials; Sand-Clay Roads; Gravel Roads; Water-Bound Macadam Roads and Pavements; Concrete Roads and Pavements; Vitri-fied Brick Roads and Pavements; Wood-Block Pavements; Stone-Block Pavements; Bituminous Road and Pavement Materials; Dust Layers and Bituminous Carpets; Penetration and Mixed Macadam Roads and Pavements; Sheet Asphalt and Asphaltic Concrete Surfaces; Selection of Type of Surface for Rural Highways; Selection of Type of Pavement Surface; The Design of Pavements; Tests for Bituminous Road and Paving Materials; Glossary; Index.

TACHEOMETER SURVEYING

With Special Notes on Plotting, Care and Adjustment of Instruments, Field Work, and Calculations. By M. E. Yorke Eliot. Cloth, 7½ x 5 in., illus., 10 + 148 pp. London, E. & F. N. Spon, Ltd.; New York, Spon & Chamberlain, 1916. \$2.00.

The author, it is stated, has endeavored in this book to give such information relative to the actual handling of instruments in the field and the methods adopted for working out the calculations in the office as will enable the engineering student to teach himself the practice which is based on theory. To that end the first four chapters of the book are devoted to preliminary explanations of the tacheometer and the methods of handling it, etc. Chapters V to VII, inclusive, describe the working out of an actual survey with the instrument, the operations, and the reasons for them, being explained step by step, from the selection and marking of the station points through the field work, the booking of figures, and office calculations made for the production of the plan, to the calculation of lines

and areas, etc., made from the data of the survey or from the plan itself. Explanations and illustrations of alternative methods are also given. Chapter VIII is devoted to the adjustments of the tachemeter, with a short description of recent and practical modifications of the instrument, and, in Chapter IX, the principles of construction of the slide rule are explained, as well as the application of the instrument to the reduction of field notes. The Contents are: Instruments; The Handling of Instruments; The Survey of a Simple Enclosure or Figure Bounded by Straight Lines; Determination of Heights and Horizontal Distances when Vertical Angles are Used; Field Work of a Contour Survey; Plotting; Calculation of Lines and Areas from Co-Ordinates; Adjustments of the Tachemeter; The Slide-Rule; Field Book; Index.

POCKET-BOOK OF USEFUL FORMULÆ AND MEMORANDA

For Civil, Mechanical and Electrical Engineers. By Sir Guilford L. Molesworth and Harry Bridges Molesworth. Twenty-seventh Edition, Revised and Enlarged, with an Electrical Supplement, by Walter H. Molesworth. Cloth, $3\frac{1}{2} \times 5$ in., illus., 7 + 936 pp. London, E. & F. N. Spon, Ltd.; New York, Spon & Chamberlain, 1916.

In the preface to this, the "Jubilee" edition, it is stated that fifty years have elapsed since the first edition of this Pocket-Book was published, at which time there were few, if any, engineering schools or textbooks. Progress in every branch of engineering has been enormous in these fifty years, and the authors, it is said, have spared no pains to keep pace, in this edition, with such advance. The contents, as stated in the title, consists of concise and comprehensive formulas and tables for the use of the civil, mechanical, and electrical engineer in his everyday work, gathered from many sources and bound in convenient form for carrying in the pocket. A partial list of Contents is: Levelling, Surveying, Latitude and Longitude; Strength and Weight of Materials; Earthwork, Brickwork, Masonry, Arches and Tunnels; Struts, Columns, Beams, Floors and Roofs; Girders and Bridges; Railways and Roads; Hydraulics, Canals, Sewers, Waterworks, Docks, Irrigation, Breakwaters, Diving and Dredging; Heat, Light, Colour and Sound, Ventilation, Warming, Refrigeration and Gas; Laws of Motion, etc.; Mill-work, etc.; Workshop Recipes; Miscellaneous Machinery, etc.; Steam, Steam, Oil, and Gas Engines; Animal Power, Water Power, and Water Motors; Wind, Windmills, and Pneumatic Machines; Ships and Steam Navigation; Gunnery, Projectiles, etc.; Buoys and Moorings; Chimneys, etc.; Aeronautics, etc., etc.; Electrical Supplement; Index.

FOWLER'S MECHANICAL ENGINEER'S POCKET BOOK, 1916.

Edited by William H. Fowler. Eighteenth Annual Edition. Cloth, 6 x 4 in., illus., 66 + 576 pp. Manchester, England, Scientific Publishing Co., 1916. 2 shillings 6 pence. (Donated by The Norman, Remington Co.)

This work is a companion volume to "Fowler's Electrical Engineer's Handbook", and includes miscellaneous tables and formulas as well as much other valuable data for the use of the mechanical engineer. The Contents are: Steam Boilers and Fittings; Fuels and Combustion; Steam Engines, Steam Turbines, Locomotives; Steam Tables; Valves and Valve Gears; Internal Combustion Engines; Hydraulics; Pumps and Pumping Arrangements; Gearing and Lubrication; Hoisting and Lifting Machinery; Iron and Steel; Metals and Alloys; Beams and Pillars; Springs; Chemistry; Ventilation and Heating; Index.

FOWLER'S MECHANICS' AND MACHINISTS' POCKET BOOK, 1916.

Edited by William H. Fowler. Eighth Annual Edition. Boards, 6 x 4 in., illus., 50 + 460 pp. Manchester, England, Scientific Publishing Co., 1916. 7 pence. (Donated by The Norman, Remington Co.)

In a secondary title it is stated that this volume contains a synopsis of practical rules for fitters, turners, millwrights, erectors, pattern makers, foundrymen, draughtsmen, apprentices, students, etc., thoroughly revised and brought up to date. The Contents are: Handy References and Tables, Calculators; Materials Used in Machine Construction; Machine Tool Design; Metal Cutting Tools; Milling Cutters; High-Speed Tool Steels, Drilling and Boring Metals; Screw Threads, Screw Cutting, and Taper Turning; Emery and Emery Wheels, Shop Practice; Gearing, Rope, Belt, and Chain Driving; Lifting, Ropes and Chains; Index.

FOWLER'S ELECTRICAL ENGINEER'S POCKET BOOK, 1916.

Edited by William H. Fowler. Sixteenth Annual Edition. Cloth, 6 x 4 in., illus., 50 + 512 pp. Manchester, England, Scientific Publishing Company, 1916. 2 shillings 6 pence. (Donated by The Norman, Remington Co.)

This book, it is stated, contains exhaustive information on electrical engineering facts and data, thoroughly revised and brought up to date. The Contents are: Miscellaneous Tables, etc.; Magnetism and Magnetic Data; Conductors and Insulating Materials; Electric Lighting and Wiring; Comparison and Measurement of Resistances; Electrical Measuring Instruments; Electricity Meters; Primary and Secondary Batteries; Dynamos and Motors; Alternate Electric Currents; Alternators; Transformers; Alternate Current Motors; Switchboards, Circuit Breakers, and Lightning Arresters; Power Transmission and Distribution; Converting Plant; Electric Traction; Rules and Regulations; Index.

Gifts have also been received from the following:

- | | |
|---|---|
| Alabama-State Highway Dept. 2 pam. | Massachusetts-State Dept. of Health. 1 pam. |
| Aldershot Gas, Water & Dist. Lighting Co. 1 pam. | Massachusetts-State Highway Comm. 1 bound vol. |
| Am. Road Builders' Assoc. 1 pam. | Metcalf & Eddy. 1 pam. |
| Am. Telephone & Telegraph Co. 1 pam. | Minnesota, Univ. of. 5 pam. |
| Assoc. of Ontario Land Surveyors. 1 pam. | Mississippi-Holly Springs Road Dist. Comm. 1 pam. |
| Australasian Inst. of Min. Engrs. 6 vol., 8 pam. | National Elec. Light Assoc. 1 pam. |
| Baltimore, Md.-Water Board. 1 bound vol. | National Highways Assoc. maps. |
| Belzner, Theodore. 1 pam. | Nebraska-State Ry. Comm. 1 pam. |
| Bilboa, Spain-Junta de Obras del Puerto. 1 bound vol. | New Hampshire-Public Service Comm. 2 pam. |
| Boston, Mass.-City Auditor. 1 bound vol. | New Jersey-Board of Commerce and Navigation. 1 pam. |
| Bowman, Harry F. 1 pam. | New Jersey-Bureau of Industrial Statistics. 1 bound vol. |
| British Assoc. for the Advancement of Science. 1 bound vol. | New Jersey-Civ. Service Comm. 1 pam. |
| British Columbia-Minister of Mines. 1 vol. | New Jersey-Comptroller of the Treasury. 1 bound vol. |
| Brockton, Mass.-City Engr. 1 pam. | New South Wales-Metropolitan Board of Water Supply. 1 vol. |
| Buffalo, Rochester & Pittsburgh Ry. Co. 1 pam. | New York City-Dept. of Finance. 1 pam. |
| Bureau of Ry. Economics. 3 pam. | New York City-Dept. of Health. 1 pam. |
| Bureau of Ry. News and Statistics. 1 bound vol. | New York State-Public Service Comm., Second Dist. 6 pam. |
| Bush, H. D. 1 pam. | New York State Chamber of Commerce. 1 bound vol. |
| Case, Gerald O. 1 pam. | New York State Univ. 3 pam. |
| Charleston, S. C.-Mayor. 1 bound vol. | New Zealand-Geol. Survey Branch. 1 pam. |
| Colombia-Ministerio de Relaciones Exteriores. 1 pam. | New Zealand-Minister of Rys. 1 pam. |
| Detroit, Mich.-Commr. of Public Works. 1 vol. | Pan-American Scientific Congress, 2d. 9 pam. |
| Doolling, Peter J. 1 bound vol. | Pennsylvania-Bureau of Rys. 1 bound vol. |
| Egyptian Delta Light Rys. Co., Ltd. 1 pam. | Pennsylvania-Public Service Comm. 16 pam. |
| Engrs. Club of Dayton. 1 pam. | Pennsylvania-State Forestry Dept. 1 pam. |
| Fonda, Johnstown & Gloversville R. R. Co. 1 pam. | Pennsylvania-State Highway Dept. 1 pam. |
| George, James Z. 1 pam. | Philippine Islands, Univ. of. 1 pam. |
| Georgia-Geol. Survey. 1 bound vol. | Presidents' Conference Committee. 2 pam. |
| Gloucester, Mass.-Water Comms. 1 pam. | Quebec-Ministère de la Colonisation, des Mines et des Pêcheries. 1 vol. |
| Hering & Gregory. 405 bound vol., 1457 vol. | Reading, Pa.-Bureau of Water. 1 bound vol. |
| Illinois, Univ. of. 2 bound vol., 1 vol. | Rhodesia Rys. Co., Ltd. 1 pam. |
| Institution of Mech Engrs. 1 bound vol. | St. Paul, Minn.-Board of Water Comms. 1 pam. |
| Inter. Eng. Congress. 1 bound vol. | Salt Lake City, Utah-Board of Health. 1 vol. |
| Iowa-State Highway Comm. 1 pam. | Smithsonian Institution. 1 vol. |
| Jacobs, Jacob L. 1 pam. | South Dakota, Univ. of. 1 pam. |
| Lehigh Valley R. R. Co. 2 pam. | Stocker, Edward C. 1 pam. |
| Leland Stanford, Jr., Univ. 1 pam. | |
| MacArthur Concrete Pile & Foundation Co. 1 bound vol. | |
| McKeesport, Pa.-City Comptroller. 1 pam. | |

- Svenska Teknologföreningen. 1 pam.
 Tasmania-Geol. Survey. 1 vol., 1 pam.
 1 map.
 Texas Assoc. of Members of the Am. Soc. of Civ. Engrs. 10 pam.
 Tulane Univ. 1 vol.
 Union of South Africa-Gen. Mgr. of Rys. and Harbours. 1 vol.
 Union of South Africa-Rand Water Board. 1 vol.
 United Shoe Machinery Co. 3 pam.
 U. S.-Bureau of Insular Affairs. 2 pam.
 U. S.-Bureau of Mines. 6 pam.
 U. S.-Bureau of Standards. 1 vol., 2 pam.
 U. S.-Bureau of the Census. 1 pam.
 U. S.-Coast and Geodetic Survey. 2 pam.
 U. S.-Commr. of Patents. 1 vol.
 U. S.-Dept. of Agriculture. 9 pam.
 U. S.-Engr. Office, Chicago, Ill. 1 specif.
 U. S.-Engr. Office, Dallas, Tex. 1 specif.
 U. S.-Geol. Survey. 5 vol., 7 pam., 9 maps.
 U. S.-Lake Survey Office. 1 pam.
 U. S.-Office of Public Roads. 2 pam.
 Universidad Nacional de la Plata. 1 pam.
 Vermont, Univ. of. 1 pam.
 West Virginia-Geol. Survey. 1 bound vol., 1 pam., 1 map.
 Western Univ. 1 pam.
 Woonsocket, R. I.-Water Commrs. 1 pam.
 Wyoming, Univ. of. 2 pam.

BY PURCHASE

Hydraulic Flow Reviewed: A Book of Reference of Standard Experiments on Pipes, Channels, Notches, Weirs, and Circular Orifices, Together with New Formulæ Relating Thereto. By Alfred A. Barnes. London, 1916.

SUMMARY OF ACCESSIONS

(From August 2d to September 5th, 1916)

Donations (including 1255 duplicates).....	2 081
By purchase.....	1
Total.....	2 082

MEMBERSHIP

(From August 4th to September 7th, 1916)

ADDITIONS

MEMBERS		Date of Membership.
ELLIOTT, MALCOLM. U. S. Asst. Engr., Louisville and Portland Canal Office, Louisville, Ky.....	Jun. } Assoc. M. } M. }	Nov. 5, 1907 April 6, 1909 June 24, 1916
MILLER, STANLEY ALFRED. Cons. Engr., 1800 Monroe St., Paducah, Ky.....	Jun. } Assoc. M. } M. }	Feb. 4, 1902 April 6, 1909 June 24, 1916
PERRY, CHARLES EDWARDS. Cons. Hydr. and San. Engr., 36 State St., Albany, N. Y. . .	Assoc. M. } M. }	Sept. 5, 1911 Mar. 14, 1916
ASSOCIATE MEMBERS		
COX, JOHN JOSEPH. Asst. Prof., Civ. Eng., Univ. of Michigan, Ann Arbor, Mich.....		April 18, 1916
HAMMOND, HENRY DENNIS. Associate Editor, <i>Engineering Record</i> , 239 West 39th St., New York City.....		Mar. 14, 1916
HASTINGS, RUSSELL PLATT. 535 North Comstock Ave., Whittier, Cal.....	Jun. } Assoc. M. }	Oct. 1, 1912 May 31, 1916
LEGARÉ, THOMAS KEITH. City Engr., City Hall, Columbia, S. C.....		Mar. 14, 1916
MCGRATH, JOHN KILBY. Road Engr., Fayetteville Dist., Mt. Hope, W. Va.....		June 23, 1916
MILLER, ROY EVERETT. Engr., Puget Sound Bridge & Dredging Co., 432 Central Bldg., Seattle, Wash....		May 31, 1916
MOTH, ROBERT HENRY. Cons. Engr., The W. J. Sherman Co., Toledo (Res., National Hotel, Cambridge), Ohio.		May 31, 1916
MUCHEMORE, HARRIE LANGDON. 18 Summit Rd., Elizabeth, N. J.....	Jun. } Assoc. M. }	Mar. 1, 1910 Aug. 31, 1915
NORDELL, CARL HILDER. Engr. of Designs, Sewerage Comm., City Hall, Milwaukee, Wis.....		June 23, 1916
PARKER, HENRY BRACKETTE. Delmar, N. Y. . .	Jun. } Assoc. M. }	Jan. 7, 1913 Mar. 14, 1916
POST, CLARENCE WILLARD. Contr. Engr., Eastern Bridge & Structural Co., 641A Myrtle Ave., Albany, N. Y..		June 23, 1916
SCHWEIZER, RUDOLPH, JR. Village Engr., 20 Edwin St., Ridgefield Park, N. J.....		Mar. 14, 1916
SHOEMAKER, ROY HOPKINS. Asst. Engr., Bureau of Public Works, Manila, Philippine Islands.....		May 31, 1916
SJOVALL, ARVID HENRY. Dist. Engr., Bureau of Public Works, Capiz, Philippine Islands.....		Mar. 14, 1916
TELLES, FRANCISCO TEIXEIRA DA SILVA. Chf. Municipal Engr., Prefeitura, Santos, Brazil.....		June 23, 1916
THAYER, JAMES LAWRENCE. Chf. Deputy County Engr., Lincoln County, Davenport, Wash.....		April 18, 1916

JUNIORS

Date of
Membership.

ANDERSON, ROBERT SUMTER. Care, Sanderson & Porter, 207
Gallais Bldg., Tulsa, Okla. Mar. 14, 1916
LOIDA, JOSEPH LOUIS. 2016a Victor St., St. Louis, Mo. June 23, 1916
TRACY, CLARENCE CURTIS. Engr.-Draftsman, The New
Jersey Zinc Co., Palmerton, Pa. Mar. 14, 1916

CHANGES OF ADDRESS

HONORARY MEMBERS

MACKENZIE, ALEXANDER. Retired Chf. of Engrs. and Maj. Gen., U. S. A.,
1827 Belmont Rd., Washington, D. C.

MEMBERS

ALLAIRE, ALEXANDER. Dist. Mgr., The Foundation Co., Woolworth Bldg.,
New York City.
ANDERSON, GEORGE GRAY. Cons. Engr., 336 Consolidated Realty Bldg., Los
Angeles, Cal.
ARMSTRONG, WALTER ROOT. Engr., M. of W., U. P. System, Omaha, Nebr.
BAKER, HOLLAND WILLIAMS. U. S. Asst. Engr., 560 Carpenter St.,
Columbus, Ohio.
BOGGS, FRANK CRANSTOUN. Maj., Corps of Engrs., U. S. A.; Purchasing
Depot Engr. Officer, Room 512, Gibbs Bldg., San Antonio, Tex.
COLE, HARRY OUTEN. 120 Broadway, Room 3529, New York City.
CONTRI, SILVIO. 10 rue du Laos, Paris, France.
CONWAY, GEORGE ROBERT GRAHAM. Care, The Mexican Light & Power Co.,
18 Manning Arcade, Toronto, Ont., Canada.
COOK, FREDERICK SCOTT. Div Engr., Dept. of Water Supply, Gas and
Electricity; Res., Clinton Ave., R. 2, Plainfield, N. J.
CRUMP, RALPH LEE. Care, Ford, Bacon & Davis, 115 Broadway, New
York City.
EARLE, THOMAS. Vice-Pres., Bethlehem Steel Bridge Corporation, South
Bethlehem, Pa.
ELLIOTT, JAMES RUTHERFORD. Cons. Engr., 2412 First National Bank Bldg.,
Pittsburgh, Pa.
ENZIAN, CHARLES. Care, P. & R. C. & I. Co., Pottsville, Pa.
EWING, WILLIAM WALLACE. Special Agt., Bureau of Foreign and Domestic
Commerce, Washington, D. C.
FISHER, HOWELL TRACY. 8 Spring Lane, Englewood, N. J.
GOODWIN, JAMES BOWMAN. Asst. Engr., Hydro-Elec. Power Comm. of
Ontario, 125 Culp St., Niagara Falls, Ont., Canada.
GRANBERRY, JULIAN HASTINGS. With Richard Norton, Care, Brown, Shipley
& Co., 123 Pall Mall, London, England.
HAZLEHURST, JAMES NISBET. Cons. Municipal Engr., P. O. Box 1273,
Atlanta, Ga.
HILL, WALTER HOVEY. Vice-Pres., Adams County Light & Power Co., 917
Franklin St., Boise, Idaho.

MEMBERS—(Continued)

- HODGMAN, HARRY. U. S. Asst. Engr., Missouri River Impvt., Jefferson City, Mo.
- HOUSTON, GAVIN NELSON. Care, Pershing & Titsworth, Denver, Colo.
- HOWIE, HOWARD BENSON WILBERFORCE. Rockwood, Tenn.
- HUTCHINGS, WILLIAM EVELYN. 1629 Everette Ave., Louisville, Ky.
- JAMESON, CHARLES DAVIS. Peking, China.
- JOHNSON, LEWIS E. Care, Bethlehem Steel Bridge Corporation, South Bethlehem, Pa.
- LAIRD, HARRY SNEDDEN. Lock Box 588, Clairton, Pa.
- MACKENZIE, ALEXANDER. Retired Chf. of Engrs. and Maj. Gen., U. S. A., 1827 Belmont Rd., Washington, D. C.
- MCNEAL, JOHN. Easton, Pa.
- PALMER, GEORGE FREDERICK. Care, Holloway Bros. (London), Ltd., Dornock, nr. Annan, Scotland.
- POLLEYS, WILLIAM VAUGHAN. 1413 Turks Head Bldg., Providence, R. I.
- POLLOCK, CLARENCE DUBOIS. Cons. Engr. (Pollock & Taber), Park Row Bldg., New York City.
- RHEA, FRANK. Care, Samuel A. Rhea, Saltsburg, Pa.
- RICHE, CHARLES SWIFT. Lt.-Col., Corps of Engrs., U. S. A., U. S. Engr. Office, 508 Federal Bldg., Chicago, Ill.
- RICHMOND, WALDEMAR SPAULDING. Civ. and Hydr. Engr., 429 West Willis Ave., Detroit, Mich.
- STEECE, EMMET ABNER. Supt. of Constr., U. S. Public Bldgs., Falls City, Nebr.
- STEVENS, JOHN CYPRIAN. Hydr. Engr., 927 East Kelly St., Portland, Ore.
- STRICKLER, GRATZ BROWN. 615 Colorado Bldg., Washington, D. C.
- TABER, GEORGE AYMAR. Cons. Prof. of Water Supply and Sewage Disposal, Brooklyn Polytechnic Inst.; Cons. Engr. (Pollock & Taber), Park Row Bldg., New York City.
- TAYLOR, HUGH MCGEEHEE. Chf. Engr., Ferrocarriles del Norte de Cuba, Moron, Camaguey, Cuba.
- VAN PELT, SUTTON. Cons. Engr., 6828 Normal Boulevard, Chicago, Ill.
- WALMSLEY, WALTER NEWBOLD. Gen. Mgr., Alabama Power Co., Birmingham, Ala.
- WARNER, EDWIN HALL. 422 Title Insurance Bldg., Los Angeles, Cal.
- YEATMAN, POPE. Min. Engr., 111 Broadway, Room 1109, New York City.
- ZINN, AARON STANTON. Drexel Arms Hotel, Chicago, Ill.

ASSOCIATE MEMBERS

- ADEY, JOHN SEAGER. P. O. Box 164, South Bethlehem, Pa.
- ALEXANDER, ROBERT LEE. Care, Valuation Dept., C. M. & St. P. Ry., 709 Lyon & Healy Bldg., Chicago, Ill.
- BALDRIDGE, JAMES RAMSEY. Mgr., F. W. Mark Constr. Co., Inc., 1701 Finance Bldg., Philadelphia, Pa.
- BALDWIN, FRANCIS NEAL. Terminal Engr., Trans-Mississippi Terminal Ry., 1342 Annunciation St., New Orleans, La.

ASSOCIATE MEMBERS (*Continued*)

- BARNES, FRANK WILLIAM, JR. Care, Commonwealth Acid-Phosphate Co., Wellington Station, Medford, Mass.
- BARTHOLOMEW, HERBERT. 712 Park Pl., Elmira, N. Y.
- BEGIEN, RALPH NORMAN. Chf. Engr., B. & O. R. R., Room 1302, B. & O. Bldg., Baltimore, Md.
- BLAND, MILES CARLISLE. Engr., Erecting Dept., Bethlehem Steel Bridge Corporation, The Monastery, Harrisburg, Pa.
- BRAINERD, HAROLD AFFLECK. Asst. Engr., Am. Bridge Co. (Res., 3905 Hawthorne Ave., Forest Park), Baltimore, Md.
- BRITTON, GEORGE CHESTER. Brockwayville, Pa.
- BURNETTE, FRANK RUPERT. With Am. Steel & Wire Co., 4228 West 35th St., Cleveland, Ohio.
- BURRELL, GLENN SMITH. Civ. Engr., U. S. N.; Public Works Officer, Naval Station, Guam, Mariana Islands.
- CANTWELL, HERBERT HERLUIN. Room 16, Annex Flower Bldg., Watertown, N. Y.
- CAREY, EDWARD GILMAN. Res. Engr., Edward De V. Tompkins, Inc., 196 Savoy St., Bridgeport, Conn.
- CLYDE, RAY WEDGEWOOD. Ames, Iowa.
- COMSTOCK, ARTHUR FRANCIS. Associate in Ry. Eng., Univ. of Illinois, 109 Transportation Bldg., Urbana, Ill.
- CUTLER, LEON GEORGE. 1300 La Clair Ave., Swissvale, Pa.
- DOEBLER, VALENTINE SHERMAN. 806 University Parkway, Baltimore, Md.
- DORSEY, LEANDER. Mgr., Constr. Dept., Cram Eng. Co., Maryland Casualty Bldg., Baltimore, Md.
- DUMOULIN, WALTER LOUIS. Mech. Engr., Andes Copper Min. Co., Chañaral, Chili.
- FARRIN, JAMES MOORE. Engr. and Contr. (Bartlett & Farrin), 1000 Central Station, Chicago, Ill.
- FISHER, WILBUR HOWARD. P. O. Box 37, Santa Fé, N. Mex.
- FOUGNER, NICOLAY KNUDTZON. Managing Director, Fougner's Staal-Beton Skibsbygningskompani A/S, Toldbodgaten 3, Christiania, Norway.
- GANDOLFO, JOSEPH HARRINGTON. Civ. Engr. with Westinghouse, Church, Kerr & Co., 37 Wall St., New York City.
- GERHARD, NORMAN PAUL. Asst. Engr., Board of Water Supply, Reservoir Dept., Ashokan (Res., Route 1, Saugerties), N. Y.
- GOODMAN, HARRY MINOTT. 1366 South King St., Honolulu, Hawaii.
- GRAY, HAROLD FARNSWORTH. Asst. Health Officer, City Hall, San José, Cal.
- GUISSINGER, JOHN ADAMS. 2156 Beverly Rd., Brooklyn, N. Y.
- HALE, PHILIP JEWETT. Hawkesbury, Ont., Canada.
- HAMILTON, ROSS ELROY. New Philadelphia, Pa.
- HATTAN, WILLIAM CARY. Supt. Thomas & Jones, 501 South Flores St., San Antonio, Tex.
- HESS, JOHN STRIDER. Constr. Engr., Cudahy Refining Co., Vinita, Okla.
- HITCHCOCK, WALTER ANDREW. Cons. Engr., 1606 City Hall Sq. Bldg. (Res., 2956 Pine Grove Ave.), Chicago, Ill.

ASSOCIATE MEMBERS (Continued)

- HUDSON, LEO. Cons. Engr., 802 House Bldg., Pittsburgh, Pa.
- HUNTSMAN, FRANK C. Div. Engr., C., B. & Q. R. R., Box 1380, Lincoln, Nebr.
- KAYSER, EDWARD MATHEW. 105 Chestnut Ave., Waterbury, Conn.
- KELTON, FRANK CALEB. Asst. Prof., Civ. Eng. Univ. of Arizona, Tucson, Ariz.
- KEPPEL, PAUL HENRY. Care, Eng. Dept., E. I. du Pont de Nemours & Co., du Pont Bldg., Wilmington, Del.
- KRAUSE, LOUIS GUSTAV. Asst. Engr., Bureau of Eng., Public Service Comm. of Pennsylvania, 129 North 4th St., Harrisburg, Pa.
- KYLE, GEORGE ALLEN. Care, Chf. Engr., G. N. Ry., St. Paul, Minn.
- LEE, ALONZO CHURCH. 32 Chambers St., Phillipsburg, N. J.
- LOCKWOOD, RICHARD JOHN. Vice-Pres. and Gen. Mgr., Apalachicola North. R. R., Port St. Joe, Fla.
- LOGAN, CHESTER RUSSEL. Asst. Supt. of Constr., New Penitentiary, Rural Route 3, Box 34, Lockport, Ill.
- MACLEAN, WILLIAM EUSTACE. 605 Credit Foncier Bldg., Vancouver, B. C., Canada.
- MCDONOUGH, MICHAEL JOSEPH. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Custom House, Box 1027, Memphis, Tenn.
- MAIR, JOHN WILLIAM. Box 286, Burlingame, Cal.
- MARTIN, JAMES WALTER. U. S. Asst. Engr., U. S. Engr. Office, Charleston, S. C.
- MENEFEE, FERDINAND NORTHROP. 209 North Blackstone St., Jackson, Mich.
- METCALFE, JOSEPH DAVIS. With A., T. & S. F. Ry., 1001 Harrison St., Topeka, Kans.
- MIDDLETON, RANKIN YORK. 607 Florida Life Bldg., Jacksonville, Fla.
- MILLARD, CHANCEY SPENCER. Civ. Engr., Mills, Rhines, Bellman & Nordhoff, 2131 Maplewood Ave., Toledo, Ohio.
- MYERS, FRANK TIEBOUT. Gilmer, Tex.
- OSBORN, KENNETH HOWARD. Asst. Engr., Osborn Eng. Co., 740 Engineers Bldg., Cleveland, Ohio.
- PEASE, WILLIAM ELWOOD. Chf. Engr., Cleveland & Youngstown R. R., 613 Marion Bldg., Cleveland, Ohio.
- RASMUSSEN, BERNHARD. Asst. Engr., Obras Publicas, Puerto Plata, Dominican Republic.
- REED, RALPH JOHN. Acting Chf. Engr., Union Oil Co. of California, 1311 Union Oil Bldg., Los Angeles, Cal.
- REEDER, HARRY CALVIN. Asst. Engr., N. Y. C. Ry., Care, Valuation Dept., Cleveland, Ohio.
- RICHMOND, JACKSON LITTON. Gen. Contr., Box 825, Richfield Springs, N. Y.
- SAMPSON, CORNELIUS BRAMHALL. 1623 Hudson Ave., Los Angeles, Cal.
- SAVAGE, SEWARD MERRILL. Treas., Alto Constr. Co., 1222 Kemble St., Utica, N. Y.
- SCHARSCHMIDT, SAMUEL HOWARD. 2205 East 81st St., Cleveland, Ohio.

ASSOCIATE MEMBERS (Continued)

- SCOTT, JOHN KUHN. Draftsman, Gulf Refining Co., Care, H. F. Banker, 1046 Fifth St., Port Arthur, Tex.
- SEARS, HORACE HOLMES. Cons. Engr., 14 Charles St., Hyde Park, Boston, Mass.
- SHAW, DAVID JOSEPH. 235 Lucas Ave., R. F. D. No. 3, Kingston, N. Y.
- STELLHORN, ADOLF. Civ. Engr., War Dept., U. S. A., Care, Office of Const. Quartermaster, Fort Leavenworth, Kans.
- STILES, OTHO WILLIAM. Cons. Engr. (Stevens & Stiles), 222 Commerce Trust Bldg., Kansas City, Mo.
- STINE, WALTER PEARCE. Care, Gulf Pipe Line Co., Houston, Tex.
- STRATE, THOMAS HENRY. 3416 Aldrich Ave., South, Minneapolis, Minn.
- SWAN, JOHN SIMEON. Meyers Falls, Wash.
- SWETT, EVERETT HAROLD. Asst. Engr., U. S. Reclamation Service, El Paso, Tex.
- SWICKARD, JAMES BLAINE. Care, County Surv., Court House, San José, Cal.
- THAYER, BENJAMIN SINGLE. Foreman on Constr., Inspiration Consolidated Copper Co., P. O. Box 207, Miami, Ariz.
- THOMPSON, MORRIS. Supt. of Constr., Leonard Constr. Co., R. R. No. 1, East St. Louis, Ill.
- THORNTON, JOHN EDWARD. 2806 Throckmorton St., Dallas, Tex.
- THROOP, HENRY GROSVENOR. Supt. of Line and Bldgs., New York State Rys., Utica-Syracuse Lines, 2117 South Geddes St., Syracuse, N. Y.
- TOLLES, FRANK CLIFTON. Dist. Engr., International Joint Comm., 440 Nash St., Akron, Ohio.
- TONER, ARTHUR CARLING. Dist. Engr., Portland Cement Assoc., 1420 Farmers Bank Bldg., Pittsburgh, Pa.
- TOWLE, FREEMAN EUGENE. Asst. Engr., State Highway Dept., Canaseraga, N. Y.
- VILLA, MIGUEL. Prin. Asst. Engr., Cuba Cane Sugar Corporation, Obispo 59, Havana, Cuba.
- WALKER, WILLIAM KEMP. Care, Office of Engr., M. of W., Wabash R. R., Peru, Ind.
- WHEELER, ARTHUR CHAMBERS. Care, Public Works Dept., Hilo, Hawaii.
- WILEY, RALPH BENJAMIN. Associate Prof. of San. Eng., Purdue Univ., 1012 Seventh St., West Lafayette, Ind.
- WILLIAMSON, HARRY. Lieut., Royal Engrs., 11 Cornwall Ave., Church End, Finchley, London, N., England.
- WOOD, BENJAMIN RUSSELL. Care, M. O. Williams, 2636 Howard St., San Francisco, Cal.

ASSOCIATES

- MITCHELL, LOUIS. Associate Prof. of Civ. Eng., Syracuse Univ., 515 Walnut Ave., Syracuse, N. Y.

JUNIORS

- BAKER, DONALD McCORD. Asst. Engr., U. S. Indian Irrig. Service, 1421 West 25th St., Los Angeles, Cal.
- BAUER, JOHN, JR. Crystal Falls, Mich.
- BERDEAU, RAY WILLIAM. Paraiso, Canal Zone, Panama.
- BICKERTON, WILBUR EARL. Care, Trussed Concrete Steel Co., 801 Commonwealth Bldg., Philadelphia, Pa.
- BLYTHE, FRANK JACKSON. Asst. Engr., Gilbert C. White, Box 382, Dunn, N. C.
- BROKER, ALBERT EDWARD. Unicorn Inn, Kennett Square, Pa.
- BROWN, GEORGE FRANKLIN. Care, Black & Veatch, 507 Inter-State Bldg., Kansas City, Mo.
- BUCK, ROSS JUDSON. 1309 Tippecanoe St., Lafayette, Ind.
- BUELL, WALTER AUGUSTUS. 356 School St., Cuyahoga Falls, Ohio.
- BURROWES, ROBERT WILLIAM. 2132 La Fontaine Ave., Bronx, New York City.
- CRANE, JACOB LESLIE, JR. Superv. Engr., Water Filtration Plant, for Burns & McDonnell, 502 Ogden Ave., Menominee, Mich.
- DIEHL, WILLIAM CHARLES. Care, Leonard Constr. Co., Marcoris, Dominican Republic.
- EBERLY, VIRGIL ALLEN. Care, U. S. Engr. Office, 2728 Pennsylvania Ave., Washington, D. C.
- EDDY, ADOLPHUS JAMES. Asst. Prof. of Civ. Eng., Univ. of California, 304 Civ. Eng. Bldg., Berkeley, Cal.
- GILKISON, GORDON MERCER. 212 Highland St., Syracuse, N. Y.
- HAZEN, RALPH WILLIAM. 298 Market St., Lockport, N. Y.
- HEINONEN, HENRY JALMAR. Draftsman, Blaw Steel Constr. Co., 6358 Aurelia St., East Liberty, Pittsburgh, Pa.
- HENDERSON, JOHN TAYLOR. Lieut., 12th U. S. Infantry, Nogales, Ariz.
- HESLOP, PAUL LOVERIDGE. Wissota Dam, Chippewa Falls, Wis.
- INGHAM, EDWIN AMBLER. Asst. Supt. of Constr., Cove Power Development, Care, Phenix Constr. Co., Grace, Idaho.
- KAUFMANN, ERNST GUSTAV. Care, Eastern Concrete Steel Co., Buffalo, N. Y.
- LYTLE, HENDRIX GILBERT. Care, Chf. Engr., T. & P. Ry., Dallas, Tex.
- MARKS, EDWIN HALL. Capt., Corps of Engrs., U. S. A., West Point, N. Y.
- MENKE, WILLIAM. P. O. Box 402, Harrisburg, Pa.
- OCKERT, FREDERICK WILLIAM. 8 Irvington St., Boston, Mass.
- SCHROEDER, SEATON, JR. Jamestown, R. I.
- SHEPPARD, NORMAN KIRKWOOD. 1942 Selby Ave., St. Paul, Minn.
- STANLEY, WILLIAM EDWARD. Instructor in Hydraulics, Purdue Univ., West Lafayette, Ind.
- WESTENHOFF, ALPHONSE MUELLER. Insp., Structural Div., Eng. Dept., City of Cincinnati, 1614 Westmoreland Ave., Cincinnati, Ohio.
- WILSON, CALVIN LOUGHRIDGE. 1222 Jennings Ave., Fort Worth, Tex.
- WILSON, DEE LELAND. Asst. Engr., Nipe Bay Co., Preston, Cuba.

DEATHS OF RECEIVING ARTICLES OF MONTHLY LIST OF

APPLETON, THOMAS. Elected Member, April 4th, 1883; died August 3d, 1916.

CANFIELD, EDWARD. Elected Member, December 3d, 1879; died August 18th, 1916.

HIDER, ARTHUR. Elected Member, September 7th, 1881; date of death
and place unknown.

PATTERSON, WILLIAM RODNEY. Elected Member, May 4th, 1909; died July 20th, 1916.

TABOR, ERNEST FREDERICK. Elected Member, May 1st, 1907; died August 20th, 1916.

Total Membership of the Society, September 7th, 1916.

8041.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(July 24th, to September 1st, 1916)

NOTE.—This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

- (2) *Proceedings, Engrs. Club of Phila.*, Philadelphia, Pa.
- (3) *Journal, Franklin Inst.*, Philadelphia, Pa., 50c.
- (4) *Journal, Western Soc. of Engrs.*, Chicago, Ill., 50c.
- (5) *Transactions, Can. Soc. C. E.*, Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Gesundheits Ingenieur*, München, Germany.
- (8) *Stevens Institute Indicator*, Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *Engineering Record*, New York City, 10c.
- (15) *Railway Age Gazette*, New York City, 15c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Electric Railway Journal*, New York City, 10c.
- (18) *Railway Review*, Chicago, Ill., 15c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 20c.
- (21) *Railway Engineer*, London, England, 1s. 2d.
- (22) *Iron and Coal Trades Review*, London, England, 6d.
- (23) *Railway Gazette*, London, England, 6d.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *Railway Mechanical Engineer*, New York City, 20c.
- (26) *Electrical Review*, London, England, 4d.
- (27) *Electrical World*, New York City, 10c.
- (28) *Journal, New England Water-Works Assoc.*, Boston, Mass., \$1.
- (29) *Journal, Royal Society of Arts*, London, England, 6d.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium, 4 fr.
- (31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand*, Brussels, Belgium, 4 fr.
- (32) *Mémoires et Compte Rendu des Travaux, Soc. Ing. Civ. de France*, Paris, France.
- (33) *Le Génie Civil*, Paris, France, 1 fr.
- (34) *Portefeuille Economiques des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *Cornell Civil Engineer*, Ithaca, N. Y.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Technisches Gemeindeblatt*, Berlin, Germany, 0, 70m.
- (40) *Zentralblatt der Bauverwaltung*, Berlin, Germany, 60 pfg.
- (41) *Electrotechnische Zeitschrift*, Berlin, Germany.
- (42) *Proceedings, Am. Inst. Elec. Engrs.*, New York City, \$1.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal, Military Service Institution*, Governors Island, New York Harbor, 50c.
- (45) *Coal Age*, New York City, 10c.
- (46) *Scientific American*, New York City, 15c.
- (47) *Mechanical Engineer*, Manchester, England, 3d.
- (48) *Zeitschrift, Verein Deutscher Ingenieure*, Berlin, Germany, 1, 60m.
- (49) *Zeitschrift für Bauwesen*, Berlin, Germany.
- (50) *Stahl und Eisen*, Düsseldorf, Germany.
- (51) *Deutsche Bauzeitung*, Berlin, Germany.
- (52) *Rigasche Industrie-Zeitung*, Riga, Russia, 25 kop.
- (53) *Zeitschrift, Oesterreichischer Ingenieur und Architekten Verein*, Vienna, Austria, 70h.
- (54) *Transactions, Am. Soc. C. E.*, New York City, \$12.
- (55) *Transactions, Am. Soc. M. E.*, New York City, \$10.

- (56) *Transactions*, Am. Inst. Min. Engrs., New York City, \$6.
 (57) *Colliery Guardian*, London, England, 5d.
 (58) *Proceedings*, Engrs.' Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
 (59) *Proceedings*, American Water-Works Assoc., Troy, N. Y.
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.
 (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
 (62) *Steel and Iron*, Thaw Bldg., Pittsburgh, Pa., 10c.
 (63) *Minutes of Proceedings*, Inst. C. E., London, England.
 (64) *Power*, New York City, 5c.
 (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
 (66) *Journal of Gas Lighting*, London, England, 6d.
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.
 (68) *Mining Journal*, London, England, 6d.
 (69) *Der Eisenbau*, Leipzig, Germany.
 (71) *Journal*, Iron and Steel Inst., London, England.
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
 (72) *American Machinist*, New York City, 15c.
 (73) *Electrician*, London, England, 18c.
 (74) *Transactions*, Inst. of Min. and Metal., London, England.
 (75) *Proceedings*, Inst. of Mech. Engrs., London, England.
 (76) *Brick*, Chicago, Ill., 20c.
 (77) *Journal*, Inst. Elec. Engrs., London, England, 5s.
 (78) *Beton und Eisen*, Vienna, Austria, 1, 50m.
 (79) *Forscherarbeiten*, Vienna, Austria.
 (80) *Tonindustrie Zeitung*, Berlin, Germany.
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
 (82) *Mining and Engineering World*, Chicago, Ill., 10c.
 (83) *Gas Age*, New York City, 15c.
 (84) *Le Ciment*, Paris, France.
 (85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.
 (86) *Engineering-Contracting*, Chicago, Ill., 10c.
 (87) *Railway Maintenance Engineer*, Chicago, Ill., 10c.
 (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.
 (89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., \$5.
 (90) *Transactions*, Inst. of Naval Archts., London, England.
 (91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
 (92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
 (95) *International Marine Engineering*, New York City, 20c.
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
 (98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.
 (99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, \$2.
 (100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.
 (101) *Metal Worker*, New York City, 10c.
 (102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
 (103) *Mining Press*, San Francisco, Cal., 10c.
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.
 (106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.
 (107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
 (108) *Iron Tradesman*, Atlanta, Ga., 10c.
 (109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.
 (110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.
 (111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.
 (112) *Internationale Zeitschrift für Wasser-Versorgung*, Leipzig, Germany.
 (113) *Proceedings*, Am. Wood Preservers' Assoc., Baltimore, Md.
 (114) *Journal*, Institution of Municipal and County Engineers, London, England, 1s. 6d.
 (115) *Journal*, Engrs.' Club of St. Louis, St. Louis, Mo., 35c.
 (116) *Blast Furnace and Steel Plant*, Pittsburgh, Pa., 15c.

LIST OF ARTICLES

Bridges.

- Vibrations and Oscillations of Bridges.* D. H. Remfry. (23) Serial beginning June 23.
 Electric Power Input for Railroad Bridges Movable in a Vertical Plane. Burton R. Leffler. (85) July.
 Discussion on Impact.* L. N. Edwards. (85) July.
 Pretoria Avenue Bridge, Ottawa.* L. McLaren Hunter. (96) July 6.
 The Economical Section for Short Span, Reinforced Arches Carrying Light Highway Loadings.* C. B. McCullough. (86) July 26.

* Illustrated.

Bridges—(Continued).

- Bensalem Avenue Concrete Arch Bridge, Philadelphia, Pa.* Jonathan Jones. (86) July 26.
 Large Bridge Pier Construction Using Steel Forms.* (86) July 28.
 Military Ponton Bridges Used in the United States Army.* Percy E. Barbour. (13) July 27.
 New Railway Bridge over Ohio at Metropolis, Ill.* (13) July 27.
 Solid Floors for Through Girder Spans.* (15) July 28.
 Abandoned Bridge Difficult to Destroy.* J. H. Weatherford. (14) July 29.
 New Wood Floor Construction for Bascule Bridges.* (13) Aug. 3.
 A Semi-Floating Highway Bridge.* (14) Aug. 5.
 Plate-Girder Cantilever Bridge.* Arthur G. Hayden. (13) Aug. 10.
 New Three-Track Bascule Bridge at Chicago.* (15) Aug. 11; (18) Aug. 12.
 Steel Spans and Concrete Arches Combined to Form Unusual Bridge at Ninetieth Street, Cleveland.* (14) Aug. 12.
 Mission Bridge in Canadian Northwest Designed as Adornment to its Location.* John F. Greene. (14) Aug. 12.
 South Cantilever Arm of Quebec Bridge Completed.* A. J. Meyers. (13) Aug. 17; (96) Aug. 17.
 Theory of Displacements Applied to Analysis of Suspension Bridges.* C. S. Whitney. (14) Aug. 19.
 Overflow Bridges, Types of Overflow Bridges used in M'Lennan County, Texas.* William C. Davidson. (86) Aug. 23.
 Popolopen Steel Arch in the Hudson Highlands.* (13) Aug. 24.
 Condition of Iron in the Old Keokuk Bridge.* George C. Hinckley. (13) Aug. 31.
 Quebec Suspended-Span Hoisting Details Completed.* A. J. Meyers. (13) Aug. 31.
 Straightening 70-Ft. I-Beams Bent by Flood.* (13) Aug. 31.
 Note sur le Calcul des Arcs Elliptiques Encastrés. G. Guillaumin. (43) Nov., 1915.
 Strassenbrücke über die Sihl bei Scheeren.* Fritz Locher. (107) July 1.

Electrical.

- Recent Street Lighting Problems and Developments. J. R. Cravath. (4) June.
 Some Experiences in Connection with Chicago's Street Lighting System. Arthur C. King. (1) June.
 Graphic Determination of Hysteresis Loss.* A. Castex. (73) July 14.
 Power Requirements and Resources of New South Wales.* William Corin. (Abstract of paper read before the Elec. Assoc. of Australia.) (73) Serial beginning July 14.
 Instrument Transformers.* Chas. C. Garrard. (73) Serial beginning July 14.
 Adjustable-Speed Polyphase Induction Motors.* (26) July 14.
 The Effects of Power Factor on Voltage Regulation.* F. A. Annett. (64) July 18.
 New Development in Switchgear Control.* A. G. Collis. (12) Serial beginning July 21.
 A New Electrolytic Interrupter.* C. A. Oldroyd. (19) July 22.
 Power System of the Syracuse Lighting Co.* Norman G. Meade. (64) July 25.
 Effects of Eddy Currents.* W. N. Cross. (64) July 25.
 Construction of an Electrical Subway Crossing on a Highway Bridge.* C. M. Hartley. (86) July 26.
 Charging Electric Vehicle Batteries. (12) July 28.
 Some Mechanical Analogies in Electricity and Magnetism.* W. S. Franklin. (From *General Electric Review*.) (73) July 28.
 Electrolytic Chlorine for Laundries.* H. P. Hill. (27) July 29.
 Skin Effect and its Practical Treatment. (Transmission wires.)* Clem A. Copeland. (111) Serial beginning July 29.
 Rates for Residence Lighting, Compilation of Population Served at Various Minimum Charges and Maximum Net Rates.* (27) July 29.
 Steel Conductors for Transmission Lines.* H. B. Dwight. (42) Aug.
 Why Motor Drive is Best.* William H. Easton. (9) Aug.
 The High-Voltage Potentiometer.* Harris J. Ryan. (42) Aug.
 Insulator Failures under Transient Voltages.* W. D. Peaslee. (42) Aug.
 Testing for Defective Insulators on High Tension Transmission Lines.* B. G. Flaherty. (42) Aug.
 Underground Distribution Systems. G. J. Newton. (42) Aug.
 Temperature Rise of Insulated Lead-Covered Cables.* Richard C. Powell. (42) Aug.
 A Distribution System for Domestic Power Service from Commercial and Engineering Standpoints. Carl H. Hoge and Edgar R. Perry. (42) Aug.
 An Artificial Transmission Line with Adjustable Line Constants.* C. Edward Magnusson and S. R. Burbank. (42) Aug.
 Characteristics of Admittance Type of Wave Form Standard.* Frederick Bedell. (42) Aug.
 Three Thousand Volt Direct Current Substations.* (64) Aug. 1.

* Illustrated.

Bridges—(Continued).

- Benjamin Avenue Concrete Arch Bridge, Philadelphia, Pa.* (Continued from p. 580)
 July 25.
 Lacey Bridge Pier Construction Under Steel Form.* (80) July 25.
 Military Ponton Bridges Used in the United States Army.* Percy E. Garbutt.
 (13) July 25.
 New Railway Bridge over Ohio at Marietta, Ill.* (13) July 25.
 Solid Piers for Through Girder Span.* (13) July 25.
 Abandoned Bridge Ditched to Destroy.* J. H. Westford. (14) July 25.
 New Wood Floor Construction for Benaco Bridge.* (13) Aug. 5.
 A Semi-Floating Highway Bridge.* (14) Aug. 5.
 Flat-Girder Cantilever Bridge.* Arthur G. Hadden. (13) Aug. 10.
 New Three-Track Railroad Bridge at Chicago.* (13) Aug. 11; (12) Aug. 15.
 Steel Spans and Concrete Abutments Combined to Form Unusual Bridge at Winston.
 Street, Cleveland.* (14) Aug. 12.
 Mission Bridge in Cleveland Well-known Designed as Abutment to Its Location.*
 John P. Greene. (14) Aug. 12.
 South-Central Arm of Quebec Bridge Completed.* A. J. Meyer. (13) Aug. 17.
 Theory of Displacements Applied to Analysis of Suspension Bridge.* E. B.
 Whitman. (14) Aug. 19.
 Overhead Bridge, Type of Overhead Bridge used in Wisconsin County, Wis.*
 William C. Davidson. (14) Aug. 23.
 Poplar Street Arch in the Hudson Highlands.* (13) Aug. 24.
 Condition of Iron in the Old Hudson Bridge.* George C. Hadden. (13) Aug. 24.
 Quebec Suspension-Span Highway Bridge Completed.* A. J. Meyer. (13) Aug.
 24.
 Substation To Be I-Beam Pier to Flood.* (13) Aug. 24.
 Note on the Calculation of the Stiffness of Bridges.* G. H. Hadden. (13) Aug.
 24.
 Strassenbrücke über den Riff bei Rehden.* Fritz Fischer. (107) July 1.

Electric.

- Home Street Lighting Problems and Developments. J. R. Graybill. (4) June.
 Home Electricities in Connection with Chicago's Street Lighting System. Arthur
 C. Kline. (1) June.
 Graphic Determination of Hydraulic Losses.* A. Carter. (73) July 11.
 Power, Requirements and Location of New South Wales.* William L. L.
 (Abstract of paper read before the New South Wales Association.) (73) July
 11.
 Beginning July 14.
 Instrument Transformers.* Cass G. Garrard. (73) Serial beginning July 14.
 Adjust-Speed Potentiometer Induction Motor.* (73) July 14.
 The Effects of Power Factor on Voltage Regulation.* C. A. Anderson. (64) July 18.
 New Development in Switchgear Control.* A. G. Collins. (13) Serial beginning
 July 21.
 A New Electrically Interlocking.* C. A. Oldroyd. (19) July 22.
 Power System of the Syracuse Lighting Co.* Norman G. Menden. (64) July 22.
 Effects of Eddy Currents.* W. N. Cross. (64) July 22.
 Construction of an Electrical Subway Crossing on a Highway Bridge.* G. M.
 Harker. (64) July 22.
 Charging Electric Vehicle Batteries. (13) July 22.
 Some Mechanical Analogs to Electricity and Magnetism.* W. A. W. W. W.
 (From Glasgow Review.) (73) July 22.
 Electrolytic Chlorine for Lanthanides.* H. P. Hill. (13) July 22.
 Skin Effect and its Practical Treatment (Transmission wires).—Chas. A. Copeland.
 (11) Serial beginning July 22.
 Rates for Residential Lighting. Construction of Population Survey at Various Min-
 imum Charges and Maximum Net Rates.* (13) July 22.
 Steel Conductors for Transmission Lines.* H. B. Dwight. (42) Aug.
 Why Motor Drive is Best.* William H. Barton. (9) Aug.
 The High-Voltage Potentiometer.* Harry J. Ryan. (41) Aug.
 Insulator Failures under Transient Voltage.* W. D. Penhale. (41) Aug.
 Testing for Defective Insulators on High Tension Transmission Lines.* B. B.
 Flaherty. (42) Aug.
 Underground Distribution Systems.* G. J. Newton. (42) Aug.
 Temperature Rise of Insulated Lead-Covered Cables.* Richard C. Powell. (42)
 Aug.
 A Distribution System for Domestic Power Supply from Commercial and Non-
 the Standpoint. Carl H. Lugs and Edgar L. Perry. (42) Aug.
 An Artificial Transmission Line with Adjustable Line Constants.* C. Edward
 Magnusson and S. R. W. W. W. (42) Aug.
 Characteristics of Adjustable Type of Wave Form Standards.* Frederick Hubert.
 (42) Aug.
 Three Thousand Volt Direct Current Substation.* (64) Aug. 1.

Electrical—(Continued).

- Alternator Excitation and Exciters.* Gordon Fox. (64) Aug. 1.
 Tests on Oil-Switches.* Bruno Bauer. (73) Aug. 4.
 A 3 000 to 5 700-Kva. Substation Built at Low Cost.* L. J. McKenzie. (27) Aug. 5.
 Reckoning with Costs of Superseded Equipment.* Edwin D. Dreyfus. (27) Aug. 5.
 Long-Distance and Cable Telephony (Underground and Submarine).* B. S. Cohen and J. G. Hill. (73) Serial beginning Aug. 11.
 Iron and Steel Electrical Conductors.* T. A. Worcester. (Abstract from *General Electric Review*.) (12) Aug. 11.
 New Low-Resistance Standards. C. V. Drysdale. (73) Aug. 11.
 Electric Signaling with Bare Wires.* (Abstract from Report of the British Home Office.) (73) Aug. 11.
 Graphical Solution of Transmission Line Problems.* T. A. Wilkinson. (27) Aug. 12.
 The World's Largest Direct-Current Station.* Fred Allison. (27) Aug. 12.
 Ventilating Electric Machines.* Gordon Fox. (64) Aug. 15.
 Power Factor Meters.* (12) Aug. 18.
 Earth Connections for Telephone Exchanges.* W. H. Grinstead. (73) Aug. 18.
 Adapting Direct-Current Motors to Changed Conditions.* H. L. Smith. (Abstract from *Electric Journal*.) (73) Aug. 18.
 The Air-Gap Field of the Polyphase Induction Motor.* F. T. Chapman. (73) Serial beginning Aug. 18.
 The Manufacture of Electric Cables. (47) Aug. 18.
 A Method of Studying Edison Distribution Systems.* C. E. Bennett. (27) Aug. 19.
 Analysis of Frequency in Oscillatory Circuits.* G. W. O. Howe. (27) Aug. 19.
 Mechanical Strength of Copper Wire Splices.* E. R. Shepard. (27) Aug. 19.
 Magnetic Permeable Cylindrical Conductors.* Clem A. Copeland. (111) Aug. 19.
 Experience with Electric Heating of Dwellings.* J. D. Ross. (27) Aug. 26.
 Building up a Big Power Load on an Electric Railway.* (17) Aug. 26.
 Modern Applications of Electricity to Medicine.* Donald K. Lippincott. (111) Aug. 26.
 Die neuen Telephon-Zentralen in Zürich.* (107) July 22.

Marine.

- The Yield of Riveted Connections in Shipbuilding. Arthur R. Liddell. (12) July 14.
 Design of an Ideal Thrust Block.* C. P. Tanner. (Paper read before the Inst. of Marine Engrs.) (47) July 14.
 5-Ton Electric Cranes for Shipyards.* (11) July 21.
 Deflection of Ships Due to Temperature Influence.* K. Suyehiro. (Paper read before the Japanese Inst. of Naval Archts.) (11) July 28.
 The Electrical Equipment of a Modern Foreign Submarine Boat.* Norman H. Wood. (26) Serial beginning Aug. 4.
 Illumination in the Navy (U. S. A.) C. S. McDowell. (73) Aug. 18.
 Les Débuts de la Navigation Transatlantique en France. E. Evers and A. Mallet. (32) Jan.
 La Commande Electrique des Gouvernails.* A. Foillard. (33) July 29.

Mechanical.

- The Electrically Driven Gyroscope and its Uses.* Elmer A. Sperry. (2) July.
 Diesel Engines.* F. Reginald Phipps. (114) July.
 On the Formation of Steam.* James Scott. (21) July.
 The Formation of Aromatic Compounds from the Cracking of a Gas Oil.* Gustav Egloff and Thomas J. Twomey. (105) July 1.
 Boiler-Room Cost Curves.* J. D. Morgan. (64) July 4.
 Burning Coke Breeze.* (64) July 4.
 Operating Costs for Municipal Gas-Engine Plant.* H. T. Melling. (64) July 4.
 Developing Efficiency in Central Stations.* O. M. Rogers. (64) July 4.
 Commercial Motor Vehicles for Railway and Industrial Purposes.* (23) July 7.
 Storage of Oil Fuel. (64) July 11.
 Comparison of Modern Coal-Gas Plants.* Vernon Baker. (66) July 11.
 Coal Tar and its Distillation. H. Zollkofer. (66) July 11.
 Flow of Oil Through Orifices.* (64) July 11.
 Boiler House Design and Operation. W. W. Lackie. (Paper read before the Inc. Mun. Elec. Assoc.) (11) July 14.
 The Sykes Gear-Cutter for Double Helical Teeth.* (11) July 14.
 Operating Conditions at Newark, Ohio, Power Plant.* W. O. Rogers. (64) July 18.
 The Fractional Distillation of Lubricating Oils.* J. G. O'Neill. (Abstract from *Journal, Am. Soc. Naval Engrs.*) (64) July 18.
 A 5 000-Hp. Silent-Chain Drive.* John R. Allen. (64) July 18.

* Illustrated.

Electrical—(Continued).

- Alternator Excitation and Exciters. Gordon Fox. (64) Aug. 1.
Tests on Oil-Switches. Bruno Hauer. (73) Aug. 4.
A 3,000 to 5,700-Kva. Substation Built at Low Cost. L. J. McKenna. (77) Aug. 8.
Reckoning with Costs of Superheated Equipment. Edwin D. Preston. (77) Aug. 8.
Long-Distance and Cable Telephony (Underground and Submarine). B. S. Cohen and J. G. Hill. (73) Serial beginning Aug. 11.
Iron and Steel Electrical Conductors. T. A. Worcester. (Abstract from General Electric Review.) (15) Aug. 11.
New Low-Resistance Standards. C. V. Dwydall. (73) Aug. 11.
Electric Signaling with Bare Wires. (Abstract from Report of the British Home Office.) (73) Aug. 11.
Graphical Solution of Transmission Line Problems. T. A. Wilkinson. (77) Aug. 12.
The World's Largest Direct-Current Station. Fred Allison. (77) Aug. 12.
Ventilating Electric Machines. Gordon Fox. (64) Aug. 15.
Power Factor Meters. (12) Aug. 18.
Earth Connections for Telephone Exchanges. W. H. Grinstead. (73) Aug. 18.
Adapting Direct-Current Motors to Changed Conditions. H. L. Smith. (Abstract from Electric Journal.) (73) Aug. 18.
The Air-Gap Field of the Polyphase Induction Motor. E. T. Chapman. (73) Aug. 18.
The Serial beginning Aug. 18.
The Manufacture of Electric Cables. (47) Aug. 18.
A Method of Studying Electric Distribution Systems. C. E. Bennett. (77) Aug. 18.
Analysis of Frequency in Oscillatory Circuits. G. W. O. Howe. (77) Aug. 18.
Mechanical Strength of Copper Wire Splices. E. R. Shepard. (77) Aug. 18.
Mechanical Formable Cylindrical Conductors. Clem A. Copeland. (111) Aug. 19.
Experiments with Electric Heating of Buildings. J. D. Ross. (77) Aug. 20.
Building up a Big Power Load on an Electric Railway. (17) Aug. 20.
Modern Applications of Electricity to Medicine. Donald K. Lippincott. (111) Aug. 20.
The new Telephone-Exchanges in Berlin. (107) July 23.

Marine.

- The Yield of Riveted Connections in Shipbuilding. Arthur R. Liddell. (12) July 14.
Design of an Ideal Thrust Block. C. F. Tanner. (Paper read before the Inst. of Marine Engineers.) (47) July 14.
5-Ton Electric Cranes for Shipyards. (11) July 21.
Deflection of Ships Due to Temperature Influence. K. Seyehito. (Paper read before the Japanese Inst. of Naval Architects.) (11) July 22.
The Electrical Equipment of a Modern Foreign Submarine Boat. Norman H. Wood. (26) Serial beginning Aug. 4.
Illustration in the Navy. U. S. A. C. S. McDowell. (73) Aug. 18.
Les Débris de la Navigation Transatlantique en France. B. Biers et A. Mallet. (32) Jan.
La Commande Electrique des Gouvernails. A. Follard. (33) July 29.

Mechanical.

- The Electrically Driven Gyroscope and its Uses. Elmer A. Sperry. (2) July.
Diesel Engines. F. Reinald Phillips. (114) July.
On the Formation of Steam. James Scott. (21) July.
The Formation of Atomic Compounds from the Cracking of a Gas Oil. Gustav Reif and Thomas J. Towns. (103) July 1.
Boiler-Room Coast Curves. J. D. Morgan. (64) July 4.
Burning Coke Breezes. (64) July 4.
Operating Costs for Municipal Gas-Engines Plant. H. T. Melling. (64) July 4.
Developing Efficiency in Central Stations. G. M. Rogers. (64) July 4.
Commercial Motor Vehicles for Railway and Industrial Purposes. (23) July 7.
Storage of Oil Fuel. (64) July 11.
Comparison of Modern Coal-Gas Plants. Vernon Baker. (66) July 11.
Coal Tar and the Distillation. H. Zollhofer. (66) July 11.
Flow of Oil Through Orifices. (64) July 11.
Boiler House Design and Operation. W. W. Jackie. (Paper read before the Inst. of Elec. Assoc.) (11) July 14.
The Styles Gas-Cut-Off for Double Helical Teeth. (11) July 14.
Operating Conditions at Newark. Ohio. Power Plant. W. O. Rogers. (64) July 18.
The Fractional Distillation of Lubricating Oils. J. G. O'Neill. (Abstract from Journal, Am. Soc. Naval Architects.) (64) July 18.
A 5,000-Hp. Silent-Chain Drive. John R. Allen. (64) July 18.

* Illustrated.

Mechanical—(Continued.)

- Mechanical—(Continued.)**
- Oil Engines and Steam Engines in Combination. Geoffrey Porter. (Paper read before the Diesel Engine Users Assoc.) (47) July 21; (11) July 21; (73) July 21; (20) Aug. 24.
- Aerodynamical Properties of the Triplane.* J. C. Hunsaker. (11) July 21.
- Subsurface Congestion has Become an Acute Problem in New York.* C. N. Green. (24) July 24.
- Design of a Water Brake. Winslow H. Herschel. (64) July 25.
- Smoke Abatement at a Dayton Power Plant.* Charles C. Moore. (64) July 25.
- Design and Construction of Textile-Machinery Cams.* Sumner B. Sargent. (72) July 27.
- Features in Designing the Noiseless Typewriter.* Frank A. Stanley. (72) July 27.
- Pacific Coast Steel Company's Plants.* (20) July 27.
- Jigs Used in Machining Turret-Lathe Details.* Robert Mawson. (72) July 27.
- Jigs and Fixtures Used in Automobile Work.* Fred H. Colvin. (72) July 27.
- The Arrangements of Machine Shops.* Joseph Horner. (11) Serial beginning July 28.
- Power in Rolling Steel. Charles M. Sames. (47) July 28.
- A Simple Diagram for Reducing Tachometer Readings.* Frank R. Freeman. (12) July 28.
- Diesel Engine Crankshafts.* Philip H. Smith. (Paper read before the Diesel Engine Users Assoc.) (47) July 28; (73) Aug. 11.
- Improvements in By-Product Coke Oven Practice.* G. P. Lishman. (Paper read before the Soc. of Chem. Industry.) (57) July 28; (22) July 28.
- 40-Ton Block-Setting Titan Crane at Fishguard Harbour Works.* (11) July 28.
- Two Notable Floating Cranes. H. H. Broughton. (73) July 28.
- Modern Agricultural Tractor Designs.* Victor W. Page. (46) July 29.
- Gasoline Tractor Developed in Power Ditching.* Frank C. Perkins. (14) July 29.
- Automobiles in the Great War. W. F. Bradley. (Paper read before the Automobile Engrs.) (19) Serial beginning July 29.
- British Methods of Handling Coal.* James Steelman. (19) July 29.
- Air Supply Adjustments in Rochester Gas Works Effect Saving of 64 Lb. of Fuel per Ton of Coal Carbonized. William H. Earle. (96) July 31.
- How to Select Prime Movers for Industrial Electrical Generating Plants. H. T. Luscomb. (9) Aug.
- Boiler Settings for Smokeless Combustion.* Osborn Monnett. (55) Aug.
- High Temperature Insulation.* P. A. Boeck. (55) Aug.
- Dynamic Balance.* N. W. Akimoff. (55) Aug.
- On Some Proposed Electrical Methods of Recording Gas Flow in Channels and Pipes Based on the Linear Hot-Wire Anemometer.* Louis Vessot King. (3) Aug.
- The Measurement of Viscosity and a New Form of Viscosimeter.* H. C. Hayes and G. W. Lewis. (55) Aug.
- Making the Steam Plant Adequate for Both Power and Heating. Charles L. Hubbard. (9) Aug.
- Where Belt Drive is Superior.* Henry Harrison Suplee. (9) Aug.
- The Economics of Material Handling in Manufacturing Plants; Belt Conveyors.* Reginald Trauttschold. (9) Aug.
- On the Transmission of Heat in Boilers.* E. R. Hedrick and E. A. Fessenden. (55) Aug.
- Intermittent Vertical Retorts at Leeds.* (66) Aug. 1.
- Spanning Brazos River with 10-In. Mains.* C. R. Sutton. (83) Aug. 1.
- Firing Soft Coal under Naval Boilers. William L. De Baufre. (Abstract from *Journal, Am. Soc. Naval Engrs.*) (64) Aug. 1.
- The Open Door to Results in Burning.* C. O. Arbogust and L. J. Sheridan. (76) Serial beginning Aug. 1.
- Graphic Analysis of Riveted Boiler Joints.* Alphonse A. Adler. (64) Aug. 1.
- Practical Methods for Testing Refractory Fire Brick.* C. E. Nesbitt and M. E. Bell. (76) Serial beginning Aug. 1.
- Special Valve Diagram Applied to Walschaert Gear.* E. O. Waters. (64) Aug. 1.
- The Coal-Tar Dye Industry, Past, Present and Future. Bernhard C. Hesse. (105) Aug. 1.
- Economy Test of Lentz Engine and Boiler. G. C. Long. (64) Aug. 1.
- Interesting Methods in an Old New England Pump Shop.* Frank A. Stanley. (72) Aug. 3.
- Using Steam Heat for Melting the Softer Metals.* Robert Cramer. (72) Aug. 3.
- Drop-Forging Dies for a Link Wrench and Turnbuckle.* Robert Mawson. (72) Aug. 3.
- The New Home of the Jacobs Chuck.* W. E. Freeland. (20) Aug. 3.
- Portland Cement Made from Oyster Shells.* H. Struckmann. (13) Aug. 3.
- Care of Leather Belts.* J. O. Benefiel. (72) Aug. 3.
- Sandblasting and Sandblast Machines. J. J. Richardson. (Abstract of paper read before the Birmingham Assoc. of Mech. Engrs.) (47) Aug. 4.
- The Fullerton, Hodgart and Barclay Vertical Compressor.* (22) Aug. 4.
- Portable Machine Shop for U. S. Army.* (27) Aug. 5.
- Small Industrial Oil Switches.* (64) Aug. 8.

* Illustrated.

Mechanical—(Continued).

- On Engines and Steam Engines in Combination. Geoffrey Porter. (Paper read before the Diesel Engine Users Assoc.) (47) July 21; (11) July 21; (73) July 21; (20) Aug. 24.
- Aerodynamic Properties of the Triplane. J. C. Hunsaker. (11) July 21.
- Submarine Concessions has Become an Acute Problem in New York. G. N. Green. (24) July 21.
- Design of a Water Brake. Winston H. Herschel. (64) July 25.
- Smoke Abatement at a Station Power Plant. Charles C. Moore. (64) July 25.
- Design and Construction of Textile-Machinery Gears. Sumner B. Sargent. (72) July 27.
- Features in Designing the Notable Typewriter. Frank A. Stanley. (72) July 27.
- Pacific Coast Steel Company's Plans. (20) July 27.
- Uses in Machining Turret-Lathe Details. Robert Lawson. (72) July 27.
- Uses and Features Used in Automobile Work. Fred H. Colvin. (72) July 27.
- The Arrangements of Machine Shops. Joseph Horner. (11) Serial beginning July 28.
- Power in Rolling Steel. Charles M. Samsen. (47) July 28.
- A Sample Diagram for Reducing Tachometer Readings. Frank R. Freeman. (12) July 28.
- Diesel Engine Characteristics. Philip H. Smith. (Paper read before the Diesel Engine Users Assoc.) (47) July 28; (73) Aug. 11.
- Improvements in Hy-Troland Coke Oven Practice. G. P. Ishman. (Paper read before the Soc. of Chem. Industry.) (27) July 28; (22) July 28.
- 40-Ton Block-Setting Titan Crane at Fishguard Harbort Works. (11) July 28.
- Two Notable Floating Cranes. H. H. Broadbent. (72) July 28.
- Modern Agricultural Tractor Designs. Victor W. Park. (46) July 29.
- Gasoline Tractor Developed in Power Division. Frank C. Perkins. (14) July 29.
- Automobiles in the Great War. W. E. Bradley. (Paper read before the Automobile Engineers.) (19) Serial beginning July 29.
- British Methods of Handling Coal. James Steinhilber. (19) July 29.
- Air Supply Arrangements in Rochester Gas Works. Ernest Staving of 84 La. of Fuel. (66) July 31.
- How to Select Prime Movers for Industrial Electrical Generating Plants. H. T. Loomis. (9) Aug.
- Boiler Settings for Smokeless Combustion. Osborn Monnett. (22) Aug.
- High Temperature Insulation. P. A. Boeck. (22) Aug.
- Dynamometer. N. W. Almond. (22) Aug.
- On Some Proposed Electrical Methods of Recording Gas Flow in Channels and Pipes Based on the Linear Hot-Wire Anemometer. Louis Weiss Kling. (3) Aug.
- The Measurement of Viscosity and a New Form of Viscometer. H. C. Hayes and G. W. Lewis. (22) Aug.
- Making the Steam Plant Adequate for Both Power and Heating. Charles J. Hubbard. (9) Aug.
- Where Hot Air is Superior. Henry Harrison Supple. (9) Aug.
- The Economics of Material Handling in Manufacturing Plants. Bell Conveyors. (9) Aug.
- On the Transmission of Heat in Boilers. E. H. Hedrick and E. A. Fossenden. (22) Aug.
- Intermittent Vertical Retorts at Leeds. (66) Aug. 1.
- Spanning Brown River with 10-ft. Main. G. R. Sutton. (83) Aug. 1.
- Firing Coal into Naval Boilers. William L. De Hart. (Abstract from Journal, Am. Soc. Naval Engineers.) (64) Aug. 1.
- The Open Door to Results in Britain. C. O. Arbogast and L. J. Sheridan. (76) Aug. 1.
- Serial beginning Aug. 1.
- Graphic Analysis of Riveted Boiler Joints. Alphonse A. Adler. (64) Aug. 1.
- Practical Methods for Testing Refractory Fire Brick. C. E. Neff and M. E. Bell. (76) Aug. 1.
- Special Valve Diagram Applied to Walchcraft Gear. E. O. Watson. (64) Aug. 1.
- The Coal-Tar Dye Industry. Past, Present and Future. Bernhard C. Heine. (102) Aug. 1.
- Economy Test of Lantz Engine and Boiler. G. C. Long. (64) Aug. 1.
- Interesting Methods in an Old New England Pump Shop. Frank A. Stanley. (72) Aug. 3.
- Under Steam Heat for Working the Boiler Metals. Robert Grant. (72) Aug. 3.
- Deep-Forcing Dies for a Lark Wrench and Turnbuckle. Robert Lawson. (72) Aug. 3.
- The New Home of the Jacobus Clock. W. E. Prewland. (20) Aug. 3.
- Portland Cement Made from Oyster Shells. H. Strickmann. (13) Aug. 3.
- Care of Leather Belts. J. O. Herschel. (72) Aug. 3.
- Sanitation and Handing Machines. J. J. Richardson. (Abstract of paper read before the Birmingham Assoc. of Mech. Engrs.) (47) Aug. 3.
- The Portland, Hoboken and Barclay Vertical Compressor. (22) Aug. 3.
- Portable Machine Shop for U. S. Army. (27) Aug. 3.
- Small Industrial Oil Switches. (64) Aug. 3.

* Illustrated.

Mechanical—(Continued.)

- Power Cost in Paper Mill.* Thomas Wilson. (64) Aug. 8.
 Production, Properties and Use of Thermalene.* (72) Aug. 10.
 The Diesel Engine, its Field in Comparison with the Steam Turbine in Good-Size Plants.* (20) Aug. 10.
 The "Radical" Automatic.* (72) Aug. 10.
 The Lubrication of Gear-Teeth.* (11) Aug. 11.
 The Lynn-Rambush Mechanical Gas-Producer.* (11) Aug. 11.
 The Whirling Speed of Shafts.* W. M. Wallace. (12) Serial beginning Aug. 11.
 Lifting Magnets.* (73) Aug. 11.
 Describes Gas-Fired Furnace for Manufacturing Gasoline by Rittman Process.* (24) Aug. 14.
 Mechanical Engineering of a Synthetic Phenol Plant.* Frederick Pape. (105) Aug. 15.
 A New Departure in Ammonia Compression.* Charles H. Bromley. (64) Aug. 15.
 Bye-Product Gas-Oven Designed for Town Supply.* (66) Aug. 15.
 By-Products Recovered in the Manufacture of Coke.* William Hamlin Childs. (Abstract of paper read before the Am. Iron and Steel Inst.) (83) Serial beginning Aug. 15.
 Philip Carey Boiler Plant.* Thomas Wilson. (64) Aug. 15.
 The Working Efficiency of Rolling Steel. Sidney Cornell. (105) Aug. 15.
 The Viscosity of a Thermolized Paraffin Base Oil.* Gustav Egloff and Robert J. Moore. (105) Aug. 15.
 Drag Line Excavator Trackway for Levee Construction, Baton Rouge, La.* (86) Aug. 16.
 A Self-Propelling Grab Bucket Crane Excavator and Unloader.* (86) Aug. 16.
 Making Motor Trucks in the White Plant.* F. L. Prentiss. (20) Aug. 17.
 Manufacturing Operations at the Gleason Works.* E. A. Suverkrop. (72) Aug. 17.
 Results of Some Tests on Milling Cutters.* Charles N. Underwood. (72) Aug. 17.
 Manufacture of a Five-Piece Typewriter Frame.* Frank A. Stanley. (72) Serial beginning Aug. 17.
 Incombustible Volatiles Formed in Coking. E. Kùppers. (Abstract from Glückauf.) (57) Aug. 18.
 Power Required in Rolling Metals.* C. E. Davies. (12) Aug. 18.
 Electrical Driving of Rolling Mills. (22) Aug. 18.
 Interpretation of Fuel Analyses. E. G. Bailey. (Abstract of paper read before the Inter. Ry. Fuel Assoc.) (57) Aug. 18.
 400 Brake Horse-Power Four-Cylinder Gas Engine.* (12) Aug. 18.
 Largest Manufactured-Gas-Fired Furnaces, in Operation, Show Decided Economy over Fuel-Oil-Fired Installations.* (24) Aug. 21.
 Efficiency in the Boiler Room.* Joseph Harrington. (64) Aug. 22.
 New Method of Determining Factory Costs. William Kent. (20) Aug. 24.
 Gas Engine Drive in Large Machine Shop.* F. L. Prentiss. (20) Aug. 24.
 Tool Manufacture at the Smith Premier Typewriter Works.* E. A. Suverkrop. (72) Aug. 24.
 Motor Trucks Descend into Deep Building Excavation. (14) Aug. 26.
 Double-Chamber Acetylene Lamp.* (82) Aug. 26.
 Handling Coal in Large Boiler Houses.* H. V. Schlefer. (45) Aug. 26.
 Small Centrifugal Blower of High Pressure.* Henry F. Schmidt. (64) Aug. 29.
 Coke-Oven Gas as Fuel.* A. W. Morgan. (64) Aug. 29.
 Initial and Operating Costs of Power Plants. Robert P. Kehoe. (64) Aug. 29.
 Williams' "Master Form" Gearing.* Reginald Trauttschold. (72) Aug. 31.
 Economic Value of Good Shop Illumination. G. H. Stickney. (72) Aug. 31.
 Construction of Tip-Welded Cutting Tools.* T. Pilkington. (72) Aug. 31.
 Continuous Package Elevators on Philadelphia Piers.* Henry J. Edsall. (13) Aug. 31.
 Deviation of Natural Gas from Boyle's Law.* Robert F. Earhart and Samuel S. Wyer. (55) Sept.
 Establishing a Standard of Measurement for Natural Gas in Large Quantities. Francis P. Fisher. (55) Sept.
 Instructions for Gas Company Fitters. George Wehrle. (83). Serial beginning Sept. 1.
 Conquering the Alps by Cable Railway. (15) Sept. 1.
 La Rééducation Professionnelle des Blessés et des Amputés de la Guerre.* Ch. Dantin. (33) Serial beginning July 29.
 Le Transbordeur Funiculaire à Voyageurs du Niagara (Canada).* (33) Aug. 12.
 Beitrag zur Kenntnis der beim Aufpressen von Scheibenrädern auf ihre Wellen entstehenden Beanspruchungen.* E. Müller. (107) June 24.

Metallurgical.

- The Rate of Driving the Blast Furnace.* J. E. Johnson. (105) July 1.
 The Metallurgy of the Rarer Metals. Joseph W. Richards. (Paper read before the Am. Inst. of Chem. Engrs.) (105) July 1.
 Sources of Metal Loss in Copper Refining.* Lawrence Addicks. (105) July 1.

William Inst. of Min. Civ. and * Illustrated. (47) Aug. 4; (22) July 24; (87) July 31.

* Illustrated.

- Mechanical—(Continued.)**
- Power Cost in Paper Mill. Thomas Wilson. (64) Aug. 8.
Production, Properties and Use of Thermoplastic. (72) Aug. 10.
The Diesel Engine in Field in Comparison with the Steam Turbine in Good-Size Plants. (50) Aug. 10.
The "Radical" Automatic. (72) Aug. 10.
The Lubrication of Gear-Teeth. (11) Aug. 11.
The Working Principles of Gas-Producer. (11) Aug. 11.
The Working Speed of Shafts. W. M. Wallace. (12) Serial beginning Aug. 11.
Lifting Machine. (73) Aug. 11.
Described Gas-Fired Furnace for Manufacturing Gasoline by Rittman Process. (24) Aug. 14.
Mechanical Engineering of a Synthetic Phenol Plant. Frederick Page. (102) Aug. 15.
A New Lecture in Ammonia Compression. Charles H. Bromley. (64) Aug. 15.
Hydrocarbon Gas-Oven Designed for Town Supply. (60) Aug. 15.
Hydrocarbon Recovered in the Manufacture of Coke. William Hamlin Childs. (Abstract of paper read before the Am. Iron and Steel Inst.) (82) Serial beginning Aug. 15.
Philip Carey Boiler Plant. Thomas Wilson. (64) Aug. 15.
The Working Efficiency of Rolling Steel. Sidney Cornell. (102) Aug. 15.
The Viscosity of a Thermomized Paraffin Base Oil. Gustav Egloff and Robert J. Moore. (102) Aug. 15.
Three Lane Excavator Trackway for Large Construction. Baton Rouge, La. (80) Aug. 16.
A Self-Propelling Grab Bucket Crane Excavator and Unloader. (80) Aug. 16.
Machine Motor Trucks in the White Plant. F. L. Prentiss. (50) Aug. 17.
Manufacturing Operations at the Glasgow Works. E. A. Sverdrup. (72) Aug. 17.
Results of Some Tests on Milling Gears. Charles N. Underwood. (72) Aug. 17.
Manufacture of a Five-Piece Typewriter Frame. Frank A. Stanley. (72) Serial beginning Aug. 17.
Incompressible Volatiles Formed in Gases. E. Kuppert. (Abstract from Glöckner.) (37) Aug. 18.
Power Required in Rolling Metals. C. E. Davies. (12) Aug. 18.
Refractor Division of Rolling Mills. (12) Aug. 18.
Investigation of Fuel Analysis. E. G. Bailey. (Abstract of paper read before the Inst. Ry. Fuel Assoc.) (23) Aug. 18.
400 Horse-Power Four-Cylinder Gas Engine. (12) Aug. 18.
Largest Manufactured Gas-Fired Furnace in Operation. Show Decided Economy over Fuel-Oil-Fired Installations. (14) Aug. 21.
Efficiency in the Boiler Room. Joseph Harrington. (64) Aug. 22.
New Method of Determining Factory Costs. William Kent. (50) Aug. 24.
Gas Engine Drive in Large Machine Shop. F. L. Prentiss. (50) Aug. 24.
Tool Manufacture at the Smith Premier Typewriter Works. E. A. Sverdrup. (72) Aug. 24.
Motor Trucks Descend into Deep Building Excavation. (14) Aug. 26.
Double-Chamber Acetylene Lamp. (82) Aug. 26.
Handling Coal in Large Boiler Houses. H. V. Schiele. (42) Aug. 26.
Small Centrifugal Blower of High Pressure. Henry F. Schmidt. (64) Aug. 26.
Coke-Oven Gas as Fuel. A. W. Moore. (64) Aug. 26.
Initial and Operating Costs of Power Plants. Robert F. Kehoe. (64) Aug. 26.
Williams' "Master Form" Gearing. Richard Transchold. (72) Aug. 31.
Economic Value of Good Shop Illumination. G. H. Steukney. (72) Aug. 31.
Construction of Top-Weighted Cutting Tools. T. Pirkkkanen. (72) Aug. 31.
Continuous Package Elevator on Philadelphia Pier. Henry J. Edsall. (12) Aug. 31.
Deviation of Natural Gas from Boyle's Law. Robert M. Eshart and Samuel R. Weyer. (25) Sept.
Establishing a Standard of Measurement for Natural Gas in Large Quantities. Francis P. Fisher. (25) Sept.
Instructions for Gas Company Fitters. George Wehrle. (23) Serial beginning Sept. 1.
Connecting the Alps by Cable Railway. (12) Sept. 1.
La Réduction Professionnelle des Risques et des Amputés de la Guerre. Ch. Dantla. (33) Serial beginning July 26.
Le Transbordement Périodique à Voyageurs du Niagara (Canada). (33) Aug. 12.
Beitrag zur Kenntnis der beim Aufpressen von Schweißverbindungen auf ihre Wellen entstehenden Beanspruchungen. R. Müller. (107) June 24.
- Metallurgical.**
- The Rate of Dissolving the Blast Furnace. J. E. Johnson. (102) July 1.
The Metallurgy of the Rarer Metals. Joseph W. Richards. (Paper read before the Am. Inst. of Chem. Engrs.) (102) July 1.
Sources of Metal Loss in Copper Refining. Lawrence Adickes. (102) July 1.

* Illustrated.

Metallurgical—(Continued).

- Blast Furnace Irregularities and Their Treatment.* J. E. Johnson, Jr. (105) July 15.
- Concentration and Flotation of Lead Ores in Southeast Missouri. (105) July 15.
- The Effect of Vacuum-Fusion upon the Magnetic Properties of Pure Open-Hearth Iron.* Trygve D. Yensen. (73) July 21.
- Flotation of Oxidized Ores. O. C. Ralston and Glen L. Allen. (82) July 22; (103) July 29.
- Treatment of Silver Furnace Fume by the Cottrell Process. Charles H. Aldrich. (Paper read before the Am. Electrochemical Soc.) (73) July 28.
- Principles Underlying Flotation.* Joel H. Hildebrand. (103) July 29.
- The Engle Furnace for Redistilling Spelter.* Robert H. Engle. (16) July 29.
- Distributing Blast Furnace Raw Materials.* George W. Vreeland. (116) Aug.
- How to Make Oxy-Acetylene Welds.* Henry Cave. (9) Aug.
- An Investigation Dealing with the Occurrence of Alumina Inclusions in Steel. Albert Sauveur. (105) Aug. 1.
- Flotation Experiments on a Joplin Tailings. W. A. Whitaker, George Belchic, Roy Neal and H. L. Van Velzer. (105) Aug. 1.
- Bronze Alloys for Automobile Work.* W. M. Corse and G. F. Comstock. (Abstract of paper read before the Soc. of Automobile Engrs.) (20) Aug. 3.
- An Improved Pneumatic Flotation Machine.* James M. Hyde. (103) Aug. 5.
- Acid-Resisting Alloys.* (Abstract of paper read before the Am. Inst. of Chem. Engrs.) (22) Aug. 18.
- The Function of Oil and Acid in Flotation. H. J. Stander. (82) Aug. 19.
- Iron-Boron and Iron-Carbon Alloys.* (20) Aug. 24.
- Oxygen Gas in Blast-Furnace Operations. David F. Baker. (20) Aug. 24.
- Dust Losses in Copper Smelting. L. D. Ricketts. (16) Aug. 26.
- Concentrating Mill Tailings near Park City, Utah.* W. A. Scott. (82) Aug. 26.
- A New Flotation Machine.* (82) Aug. 26.
- Flow of Air in Lead Blast Furnaces. (16) Aug. 26.
- Plant Improvements of Ashland Steel Works.* (20) Aug. 31.
- Usine pour la Préparation de l'Etain à Perth Amboy (New Jersey, E.-U.)* (33) July 22.

Military.

- Fortification.* H. B. Sauerman. (4) May.
- The Mobilization of Material and Industrial Resources. A. L. Humphrey. (58) June.
- Organization of Engineer Units of the National Guard. (98) July.
- Shrapnel Shells, How they are Designed and Tested.* George P. Jewell. (19) July 15.
- Construction of Canada's Biggest Military Camp.* W. A. Young. (96) July 20.
- A National Projectile Factory.* (12) Serial beginning July 21.
- Manufacturing the 1-Lb. High-Explosive Shell.* Robert Mawson. (72) Serial beginning July 27.
- Military Engineering: Field and Siege Engineering. George A. Zinn. (2) Aug.
- Hydraulic System in Modern Shell Plant.* F. L. Prentiss. (20) Aug. 3.
- Machining 9.2-In. High-Explosive Shells.* G. F. Bryant. (20) Aug. 3.
- Armored Car for the Use of the United States Army.* (18) Aug. 5; (15) Aug. 11.
- Making Bayonet Scabbards.* Robert Mawson. (72) Serial beginning Aug. 10.
- British Shell Factory, Typical of Several Plants, Privately Managed but Government Owned.* (20) Aug. 10.
- Large Shell Lathe with Automatic Electric Control.* (12) Aug. 11.
- Heating Plant for Shell Forgings.* (72) Aug. 17.
- A British Shell Factory, Machining Arrangements of One of the Semi-Public Plants.* (20) Aug. 17.
- Speed Sighting and Wind Deflection in Artillery.* George Greenhill. (12) Aug. 18.
- Rolling Cartridge Brass.* C. R. Barton. (72) Aug. 24.
- Three-Inch Shell Work in a Small Shop.* (72) Aug. 24.
- Making the 18-Lb. Cartridge Case.* Robert Mawson. (72) Serial beginning Aug. 24.
- Field Artillery Service Should Attract Engineers.* Ernest McCullough. (13) Aug. 26.
- Making the British Time Fuse Mark 80-44-1.* Fred H. Colvin. (72) Aug. 31.
- French Specifications for Shell Steel.* (20) Aug. 31.
- L'Erosion des Canons d'Acier par les Gas de la Poudre.* (33) July 8.
- Voiture Sanitaire Exshaw de la "Croix-Rouge-française".* (33) July 15.

Mining.

- Lucerne Mines Power Plant.* Warren O. Rogers. (64) July 11.
- Approved Safety Lamps.* (57) Serial beginning July 14.
- American Coal Mine Haulage.* (57) July 14.
- Fuel Economy at Collieries. F. F. Malret. (Abstract of paper read before the Midland Inst. of Min., Civ., and Mech. Engrs.) (47) Aug. 4; (22) July 21; (57) July 21.

Mining—(Continued).

- Koepe Winding at Plenneller Colliery.* (22) July 21.
 "British Baum" Coal Washing Plant.* (57) July 28.
 Electric Signalling in Mines.* (57) July 28; (26) Aug. 11.
 Mining Ore from Pillars.* H. H. Hodgkinson. (16) July 29.
 Blasting for Steam Shovels.* (16) July 29.
 The Gold Mines of Brazil.* Benjamin Le Roy Miller and Joseph T. Singewald, Jr. (16) July 29.
 Track Layout at Mine Tipples.* E. A. Holbrook. (45) July 29.
 Hammer Drill Records at the Franklin Mines, New Jersey. B. F. Tillson. (86) Aug.
 Cost of Installing Four Large Electric Mine Pumps. (64) Aug. 1.
 Concrete Shaft Equipment.* W. W. Lawrie and G. Hildick Smith. (From *Journal of the Chemical Metallurgical, and Mining Soc. of South Africa.*) (57) Aug. 4.
 Mining and Dealing with Mine Water in the Mold Coalfield.* William Hopwood. (22) Aug. 4.
 Snake Creek Tunnel, Utah.* (103) Aug. 5.
 The Roofing of Mine Buildings. J. W. Latimer. (45) Aug. 5.
 Gold-Saving on Dredges.* Howard D. Smith. (103) Aug. 5.
 Coal-Mining Methods in Utah.* A. C. Watts. (45) Serial beginning Aug. 5.
 Slope Haulage in Alabama.* E. B. Wilson. (45) Aug. 5.
 Revolving Dumps at Coal Mines.* H. S. Geismar. (45) Aug. 5.
 The Argonaut Mine, Calif.* Lewis H. Eddy. (16) Aug. 5.
 Quarries for Kensico Dam.* Wilson Fitch Smith. (13) Aug. 10.
 Handling Ironstone at the Buckmaster Mine of the Holwell Iron Company, Limited.* (22) Aug. 11.
 Determination of Copper in Low-Grade Ores. F. O. Hawley. (16) Aug. 12.
 Air and Temperature in Deep Mining. (82) Aug. 12.
 Estimating Metallic Aluminum in Aluminum Dust. J. E. Clennell. (16) Aug. 12.
 The Elkhorn Coal Co.'s Plant.* W. B. Webb. (45) Aug. 12.
 Drilling and Blasting Shale Banks.* Dwight E. Humphrey. (76) Aug. 15.
 Well Drilling in Modern Quarrying. S. R. Russell. (Abstract of paper read before the Du Pont Sales Convention.) (86) Aug. 16.
 Electric Winding in South Yorkshire, the New Installation at Staindrop Colliery.* (57) Aug. 18.
 Colliery Pumping Plants. C. Heal. (22) Aug. 18.
 Some Practical Notes on Mine Surveying.* W. F. Boericke. (16) Aug. 19.
 Stopping Costs in the Calumet & Arizona Mines, Bisbee, Ariz. (82) Aug. 19.
 Operations at Battle Mountain, Nevada.* W. A. Scott. (82) Aug. 19.
 Chemistry in Coal Mining. A. G. Blakeley. (45) Aug. 19.
 Yuba No. 15 All-Steel Gold Dredge.* Lewis H. Eddy. (16) Aug. 19.
 Quenching a Fire in a Kansas Mine with Chemicals.* John Pellegrino. (45) Aug. 19.
 Milling Scheelite-Gold Ores.* (16) Aug. 19.
 Replacing Mortar Blocks.* Charles Labbe. (16) Aug. 26.
 "Set-Over" Tables for the Mine Transittman.* F. C. Saner. (45) Aug. 26.
 Diamond Drilling at Sudbury. L. A. Parsons. (16) Aug. 26.
 Rating of Mine Locomotives. R. E. Hellmund and W. A. Clark. (45) Aug. 26.
 Mining Practice at Santa Gertrudis, Mexico.* (16) Aug. 26.
 Shankling Drill Steels.* Charles C. Phelps. (16) Aug. 26.
 Governing the Use of Explosives in Mines.* E. M. Weston. (82) Aug. 26.
 Testing of Dredge Bucket Pins.* Ralph A. Young. (16) Aug. 26.

Miscellaneous.

- Scientific Methods in Construction. Sanford E. Thompson and William O. Lichtner. (58) June.
 Public Service Opportunity and Preparedness. J. L. Jacobs. (4) June.
 Graphical Representation of Prices.* J. Eastwood. (104) June 16.
 What Can Best be Done to Advance the Interests of the Engineering Profession in the United States. J. A. L. Waddell. (58) July.
 Catalysis in the Formation of Gasoline from Kerosene. Gustav Egloff and Robert J. Moore. (105) July 15.
 Ethyl Alcohol from Wood, the Process, its Development and Requirements. F. W. Kressman. (105) July 15.
 The Great Dominion Telescope.* J. S. Plaskett. (Abstract from *Canadian Machinery.*) (96) July 27.
 Pushing up Production and Lowering Cost.* C. U. Carpenter. (9) Aug.
 Surveyors, their Security of Tenure and Defense. J. H. Drew. (114) Aug.
 Is Your Cost System Scientific? Wm. E. McHenry. (9) Aug.
 The Thermal Decomposition of the Aliphatic Hydrocarbon Derivatives of Naphthalene. Gustav Egloff. (105) Aug. 1.
 Stump Pullers, Operated by Hand and Horse Power.* (13) Aug. 3.
 Simple Tests for Potash. W. B. Hicks. (103) Aug. 5.

Private Owners Wagon.* (21) * Illustrated.

* Illustrated.

Mining--(Continued).

- Simple Tests for Potash. W. B. Hicks. (103) Aug. 5.
 Stump Pulverizer Operated by Hand and Horse Power. (113) Aug. 3.
 The Thermal Decomposition of the Aliphatic Hydrocarbon Derivatives of Napthalene. Gustav Eklund. (102) Aug. 1.
 Surveyors' Their Security of Tenure and Defense. J. H. Drew. (114) Aug. 1.
 Building up Production and Lowering Cost. C. U. Carpenter. (9) Aug. 1.
 The Great Dominion Telescope. J. E. Plaskett. (Abstract from Canadian Machinery.) (96) July 27.
 Elixirs Alcohol from Wood. The Process, its Development and Reduplication. F. W. Kriesman. (105) July 15.
 Catalysts in the Formation of Gasoline from Ketones. Gustav Eklund and Robert J. Moore. (102) July 15.
 What Can Best be Done to Advance the Interests of the Engineering Profession in the United States. J. A. L. Waddell. (58) July.
 Graphical Representation of Prices. J. Eastwood. (104) June 16.
 Public Service Opportunity and Preparedness. J. L. Jacobs. (4) June.
 Scientific Methods in Construction. Sanford E. Thompson and William O. Lickner. Miscellaneous.
- Testing of Dredge Bucket Pans. Ralph A. Young. (16) Aug. 26.
 Governing the Use of Explosives in Mines. E. M. Weston. (82) Aug. 26.
 Blanking Drill Steels. Charles C. Phelps. (16) Aug. 26.
 Mining Practice at Santa Gertrudis, Mexico. (16) Aug. 26.
 Rating of Mine Locomotives. R. E. Hellmuth and W. A. Clark. (45) Aug. 26.
 Diamond Drilling at Sudbury. J. A. Parsons. (16) Aug. 26.
 "Set-Over." Tables for the Mine Translators. F. C. Barber. (45) Aug. 26.
 Replacing Mortar Blocks. Charles Lappe. (16) Aug. 26.
 Mining Scheelite-Gold Ore. (16) Aug. 18.
 Quenching a Pipe in a Kansas Mine with Chemicals. John Pollock. (45) Aug. 18.
 Yuba No. 15 All-Steel Gold Dredge. Lewis H. Eddy. (16) Aug. 18.
 Chemistry in Coal Mining. A. G. Blackley. (45) Aug. 18.
 Operations at Battle Mountain, Nevada. W. A. Scott. (82) Aug. 18.
 Stopping Cores in the Cement & Arizona Mines. Disposed Ariz. (82) Aug. 18.
 Some Practical Notes on Mine Surveying. W. F. Boettcher. (16) Aug. 18.
 Colliery Pumping Plant. C. Hunt. (52) Aug. 18.
 Electric Winding in South Yorkshire, the New Installation at Stalwart Colliery. (52) Aug. 18.
 The Du Pont Sales Convention. (86) Aug. 18.
 Well Drilling in Modern Quarrying. S. R. Russell. (Abstract of paper read before Drilling and Blasting Show, New York.) (86) Aug. 18.
 The Elkhorn Coal Co.'s Plant. W. B. Webb. (45) Aug. 12.
 Reclaiming Metallic Aluminum in Aluminum Dust. J. E. Clemen. (16) Aug. 12.
 Air and Temperature in Deep Mining. (82) Aug. 12.
 Determination of Copper in Low-Grade Ores. F. O. Hawley. (16) Aug. 12.
 Handling Ironores at the Buckmaster Mine of the Holwell Iron Company, Limited. (52) Aug. 11.
 Quarries for Kansas Iron. (13) Aug. 10.
 The Aragonite Mine, Calif. Lewis H. Eddy. (16) Aug. 5.
 Revolving Pumps at Coal Mines. H. B. Gelsamer. (45) Aug. 5.
 Slope Haulage in Alabama. E. R. Wilson. (45) Aug. 5.
 Cost-Mining Methods in Utah. A. C. Wicks. (45) Aug. 5.
 Gold-Saving on Dredges. Howard D. Smith. (103) Aug. 5.
 The Roofing of Mine Buildings. J. W. Lashner. (45) Aug. 5.
 Snake Creek Tunnel, Utah. (103) Aug. 5.
 Mining and Dealing with Mine Water in the Moab Coalfield. William Hepwood. Aug. 4.
 Concrete Shaft Pumping. W. W. Lawrie and G. Hindick Smith. (From Journal of the Chemical Metallurgical and Mining Soc. of South Africa.) (57) Aug. 1.
 Cost of Installing Four Large Electric Mine Pumps. (64) Aug. 1.
 Hammer Drill Records at the Franklin Mines, New Jersey. H. F. Thibson. (86) Aug. 1.
 Track Layout at Mine Tipple. E. A. Holbrook. (45) July 29.
 The Gold Mines of Brazil. Benjamin Le Roy Miller and Joseph T. Singewald, Jr. (16) July 29.
 Blasting for Steam Shovels. (16) July 29.
 Mining Ore from Hillsides. A. H. H. Hodgkinson. (16) July 29.
 Electric Shunting in Mines. (57) July 22.
 British Bauxite Coal Washing Plant. (57) July 22.
 Rope Winding at Pierringer Colliery. (52) July 21.
 Mining--(Continued).

Miscellaneous—(Continued).

- Cable System Handles Dump Wagons on Heavy Grades.* James Owen. (13) Aug. 10.
 Cost Accounting for the Clay Plant. A. J. Huac. (76) Aug. 15.
 Methods of Removing Stumps by Blast.* Thomas M. Knight. (86) Aug. 16.
 How to Appraise Public Utility Property. George W. Kuhn. (17) Aug. 19.
 The Disposition of By-product Oven Derivatives.* W. H. Childs. (45) Aug. 26.
 Le Platine et les Gites Platinifères de l'Oural.* Louis Duparc. (32) Jan.

Municipal.

- Municipal Works of Interest in Sutton.* W. Hedley Grieves. (114) June.
 Some Public Works and Municipal Appliances at Blackpool. John S. Brodie. (114) July.
 Diagrammatic Statistics for Municipal Engineers.* Reginald Brown. (114) July.
 The Public Undertakings of Shrewsbury. A. W. Ward. (114) July.
 Snow Removal in Montreal. P. E. Mercier. (96) July 27.
 Obligatory Town Planning. Henry R. Aldridge and Harold Shawcross. (114) Aug.
 Street Sprinkling in a Small City. (86) Aug. 2.
 Loose-Leaf Filing System for City Surveys.* James M. Owens. (13) Aug. 24.
 Washington Systematizes Subsurface Mapping. Asa E. Phillips. (14) Aug. 26.

Railroads.

- Determination of Annual Charge for Sleepers, Poles and Fence Posts. W. F. Goltra. (23) June 16.
 Raising the Track Through Wilkinsburg, Pennsylvania.* (23) June 16.
 Carriage Rolling-Stock with Armoured Ends, Interlocking Fenders, Collision Buffers and Reinforcements of Body Framing.* (23) June 16; (25) Aug.
 Construction of the New York Connecting Railroad.* (23) June 23.
 Pacific Type Express Locomotives, South African Railways.* (23) June 30.
 The Signalling of Jersey City Terminal.* (23) June 30.
 Recent Locomotive Working on the Paris-Lyons and Mediterranean Railway.* (21) July.
 The Treatment of White-Oak Ties. (113) Serial beginning July.
 Position-Light Signals.* (21) July.
 Counterbalancing of Locomotives.* S. G. Thomson. (Abstract of report to the Am. Ry Master Mech. Assoc.) (21) July.
 How to Calculate Fuel Consumption in Figuring Economics of Railway Location.* John G. Sullivan. (85) July.
 Cleaning Stone Ballast with Screens.* H. M. Church. (23) July 7.
 Rebuilt Locomotives for the Jamaica Government Railway.* (23) July 7.
 New Intercepting Valve for Mallet Locomotives.* (23) July 7.
 Recent 2-8-2 Type Locomotives Constructed at the Baldwin Locomotive Works.* (23) July 14.
 Treatment of Feed Water for Locomotive Boilers. L. F. Willson. (Paper read before the Cincinnati Ry. Club.) (47) July 14.
 British Oil Locomotives.* (12) July 14.
 A Less-Than Carload Clearing House for Chicago.* Henry A. Goetz. (23) July 14.
 Grand Trunk Grade Separation in Toronto.* (23) July 21.
 The New Yard at Khargpur, Bengal-Nagpur Railway.* (23) July 21.
 Four-Cylinder 4-6-0 Type Express Locomotive, Great Southern & Western Railway.* (23) July 21; (21) Aug.
 Triplex Articulated Compound Locomotives for the Erie R. R.* (18) July 22.
 Grade-Crossing Elimination at Memphis Bridge Terminals.* (13) July 27.
 Design and Maintenance of Locomotive Boilers. (Report of Committee, Am. Ry. Master Mechanics' Assoc.) (47) July 28.
 Four-Wheel Trucks for Passenger Train Coaches.* Roy V. Wright. (23) July 28.
 The Swansea District Lines, G. W. R.* (23) July 28.
 Mallet Locomotives for Use in Road Service; Baltimore & Ohio Engines Exert Tractive Effort of 103 000 Lb.; for Use on Ruling Grades over 2 Per Cent.* (15) July 28; (25) Aug.
 Express Passenger and Goods Locomotives for the French State Railways.* (11) July 28.
 Fare Zones Adjusted in Maine.* (17) July 29.
 A Study in Electrified Freight Terminals; New York Central's Proposed West Side Improvements, New York City.* (18) July 29.
 Mallet Compound Locomotives for the Western Maryland Ry.* (18). July 29.
 Drainage Drifts have Apparently Stopped Slides at Hillside Grade Separation.* H. G. Wray. (14) July 29.
 Buffing Stresses in Box Cars.* Robert N. Miller. (25) Serial beginning Aug.
 Locomotive Firebox Proportions. Lawford H. Fry. (25) Aug.
 Cabin Cars for Crews of Freight Trains; Pennsylvania Railroad.* (21) Aug.
 Private Owners' Wagons.* (21) Aug.

* Illustrated.

Miscellaneous—(Continued).

- Cable System Handles Dump Wagons on Heavy Grades*. James Owen. (13) Aug. 10.
Cost Accounting for the City Plant. A. J. Hoon. (76) Aug. 16.
Methods of Removing Sludge by Blast*. Thomas M. Knight. (86) Aug. 16.
How to Appraise Public Utility Property. George W. Rubin. (117) Aug. 19.
The Disposition of By-product Oven Derivatives*. W. H. Childs. (148) Aug. 26.
Le Placage et les Gites Plâtriers de l'Oréal*. Louis Duparc. (151) Jan.

Municipal.

- Municipal Works of Interest in Boston*. W. Hedley Glover. (114) June.
Some Public Works and Municipal Appliances at Blackpool. John E. Hooley. (114) July.
Disastrous Statistics for Municipal Engineers*. Reikland Brown. (114) July.
The Public Undertakings of Birmingham. A. W. Ward. (114) July.
Snow Removal in Montreal. P. E. Mercier. (96) July 27.
Ottawa's Town Planning. Henry H. Aldridge and Harold Shawcross. (114) Aug.
Street Sprinkling in a Small City. (86) Aug. 2.
Loose-Laid Flume System for City Sewers*. James M. Owens. (13) Aug. 24.
Washington Systematic Subsurface Mapping. Ann E. Phillips. (14) Aug. 26.

Railroads.

- Determination of Annual Charge for Sleepers, Poles and Fence Posts. W. E. Goltz. (25) June 16.
Raising the Track Through Wilkesburg, Pennsylvania*. (25) June 16.
Gartland Rolling Stock with Armoured Ends. Interlocking Ends. Collision Buffers and Reinforcements of Body Frames. (25) June 16; (25) Aug.
Construction of the New York Connecting Railroad*. (25) June 28.
Recent Type Express Locomotives. South African Railways*. (25) June 30.
The Stalling of Jersey City Terminal*. (25) June 30.
Recent Locomotive Working on the Paris-Lyon and Mediterranean Railways*. (25) July.
The Treatment of White-Oak Timbers. (113) Serial beginning July.
Position-Light Signals*. (21) July.
Comparative Analysis of Locomotives*. S. G. Thompson. (Abstract of report to the Am. Ry. Master Mech. Assoc.) (21) July.
How to Calculate Fuel Consumption in Rating Economies of Railway Location*. John G. Sullivan. (85) July.
Cleaning Stone Ballast with Screens*. H. M. Chubb. (25) July 7.
Rebuilt Locomotives for the Jamaica Government Railway*. (25) July 7.
New Interlocking Valve for Mallet Locomotives*. (25) July 7.
Recent 2-8-2 Type Locomotives Constructed at the Baldwin Locomotive Works*. (25) July 14.
Treatment of Feed Water for Locomotive Boilers. L. E. Wilson. (Paper read before the Cincinnati Ry. Club.) (47) July 14.
Ballast Oil Locomotives*. (15) July 14.
A Less-Tan Carload Cleaning House for Chicago*. Henry A. Goetz. (25) July 14.
Grand Trunk Grade Separation in Toronto*. (25) July 21.
The New Yard at Kharagpur. Bengal-Nagpur Railway*. (25) July 21.
Four-Cylinder 4-6-0 Type Express Locomotive. Great Southern & Western Railway*. (25) July 21; (21) Aug.
Triple Articulated Compound Locomotives for the Erie R. R.*. (18) July 22.
Grade-Crossing Elimination at Memphis Bridge Terminal*. (15) July 27.
Design and Maintenance of Locomotive Boilers. (Report of Committee, Am. Ry. Master Mech. Assoc.) (47) July 28.
Four-Wheel Trucks for Passenger Train Coaches*. Roy V. Wright. (25) July 28.
The Swansea District Lines. G. W. R. R.*. (25) July 28.
Mallet Locomotives for Use in Road Service. Baltimore & Ohio Western Express. (25) July 28.
Traveling Weight of 100,000 lb.; for Use on Rolling Grades over 2 Per Cent*. (15) July 28; (25) Aug.
Express Passenger and Goods Locomotives for the French State Railways*. (11) July 28.
Four-Cylinder Articulated Compound Locomotives for the Erie R. R.*. (17) July 28.
A Study in Electrically Powered Terminals. New York Central's Proposed West Side Improvements. New York City*. (18) July 28.
Mallet Compound Locomotives for the Western Maryland Ry.*. (18) July 28.
Designs Which Have Apparently Stopped Slides at Illinois Grade Separation*. H. G. Wray. (14) July 28.
Building Structures in Hot Climates*. Robert N. Miller. (25) Serial beginning Aug.
Locomotive Wheel Propellers. Lawford H. Fry. (28) Aug.
Cable Cars for Crows of Freight Trains. Pennsylvania Railroad*. (21) Aug.

Railroads—(Continued).

- Seventy-Ton Gondola Cars.* (25) Aug.
 Maintenance Methods on the B. R. & P.* (87) Aug.
 136 Lb. Rails; Lehigh Valley R. R.* (21) Aug.
 Experimental Researches on the Skin Effect in Steel Rails.* A. E. Kennelly, F. H. Achard and A. S. Dana. (3) Aug.
 A Suggested Program for Track Work. (87) Aug.
 An Eight-Wheel English Locomotive.* (25) Aug.
 Crushed Gravel Ballast on the Rock Island.* (87) Aug.
 French Military Locomotives Built in America.* (13) Aug. 3.
 American Car Dumpers.* (57) Aug. 4.
 Meeting the Federal Headlight Requirements.* L. C. Porter. (15) Aug. 4.
 High-Powered Locomotives on the Pennsylvania Railroad.* (11) Aug. 4.
 British-Built Engines for the French State Railways.* (12) Aug. 4.
 Superheater Locomotives. (Report of a Comm., Am. Ry. Master Mechanics' Assoc.) (47) Aug. 4.
 Commercial Motors for Railway and Industrial Purposes: The Organization and Equipment of a Railway Motor Department.* (23) Aug. 4.
 New Express Locomotives for the Caledonian Railway.* (23) Aug. 4.
 Norfolk & Western Elkhorn Grade Electrification.* (23) Aug. 4.
 Railroads' Side of Valuation, as Handled on Jersey Central, No Small Task.* C. W. Stark. (14) Aug. 5.
 Care of Locomotives with Relation to Fuel Economy.* A. N. Willisie. (Abstract of paper read before the Inter. Ry. Fuel Assoc.) (18) Aug. 5.
 Wabash Grade Elimination in Fort Wayne.* (13) Aug. 10.
 Terminal Railway and New Piers at Port of Philadelphia.* (13) Aug. 10.
 Jacketing a Railway Tunnel by Mining Methods.* (13) Aug. 10.
 The Railway Lines of Syria and Palestine.* (23) Aug. 11.
 Steel Gondolas for the Russian Government.* (23) Aug. 11.
 The L. & N. W. Suburban Railway Electrification.* (26) Aug. 11.
 North Western Pulverized Coal Locomotive.* (15) Aug. 11.
 Electrification for Heavy Freight Traffic in England, Northeastern's Railway Line Between Shildon and Newport.* Frederick C. Coleman. (18) Aug. 12.
 Depreciation as Applied to Valuation. R. B. Shepard, Jr. (14) Aug. 12.
 Special Device and Procedure for Cross-Sectioning Tunnels.* T. H. Robertson. (From Ill. Central R. R. Employees Magazine.) (86) Aug. 16.
 Fissures in Rails Laid to Mill Practice.* P. H. Dudley. (20) Aug. 17; (15) Aug. 18; (18) Aug. 19.
 Contractors' Gasoline Dinkey with Friction Drive.* (13) Aug. 17.
 The Case for Machinery on Railway Construction in China. Harold Stringer. (11) Aug. 18.
 Scientific Tests on Signal Interpretation.* O. V. Fry. (15) Aug. 18.
 An Improved Turntable.* (15) Aug. 18.
 Equalisation of Long Locomotives.* (Report of Comm. to Am. Ry. Master Mechanics Assoc.) (47) Aug. 18.
 Erie Railroad 50-Ton Capacity Hopper Cars.* (15) Aug. 18.
 Electrification on the Chicago, Milwaukee, and St. Paul Railway.* (12) Serial beginning Aug. 18.
 Track Maintenance; Fall Work.* Kenneth L. Van Auken. (18) Aug. 19.
 Kenilworth Avenue Subway, Hamilton.* Kenneth Cameron. (96) Aug. 24.
 Initial Strains in Rails. (15) Aug. 25.
 Gasolene-Driven Car Ferry.* (15) Aug. 26.
 Perforation of Fir Ties before Treatment.* (18) Aug. 26.
 Use of Storage Batteries in Operation of Selector Calling Circuits for Telephone Train Despatching.* (18) Aug. 26.
 Examples of Federal Valuations of Railroads. (18) Aug. 26.
 Much Work for Railroad-Valuation Engineer Precedes Advent of Government Forces.* C. W. Stark. (14) Aug. 26.
 Train-Shed with Columns Between the Tracks.* (13) Aug. 31.
 Methods of Enlargement Work in Rogers Pass Tunnel.* H. P. Tracy. (13) Aug. 31.
 Norfolk & Western Mountain Type Locomotives.* (15) Sept. 1.
 Thomas Transmission Motor Car.* (15) Sept. 1.
 Dévers et Raccourcissements Paraboliques sur Route.* Caufourier. (43) Nov., 1915.
 Note Complémentaire sur les Spécifications Américaines pour la Fourniture des Rails.* Goupil. (43) Nov., 1915.
 La Traction Electrique en Angleterre.* J. Carlier. (33) July 8.
 L'Emploi du Charbon Pulvérisé pour le Chauffage des Locomotives.* (33) July 15.
 L'Emploi de la Détente Compound et de la Surchauffe sur les Locomotives de Réseaux français et son Influence sur la Consommation de Charbon de ces Machines. L. Baclé. (33) July 22.
 La Détermination des Eléments Nécessaires au Calcul de la Poussée des Terres. (33) July 29.
 Der Energieverbrauch der elektrischen Traktion der Berner Alpenbahn.* L. Thormann. (107) July 8.

Gallegos (Continued)

Delayed

Railroads, Street.

- Queens Boulevard Viaduct, New York Elevated Line.* Alfred M. Wyman. (18) July 22.
- Cleveland Completes Two More Terminals.* (17) July 22.
- Standard Layout Designs of the Brooklyn Rapid Transit System.* (17) July 22.
- Study of Chicago's Congested Traffic. (17) July 29.
- Portable Motor-Driven Reeling Machine.* S. L. Foster. (17) July 29.
- New Standard Types of Roadbed for Subways, Tunnels and Elevated Roads, New York City.* R. H. M. Canfield. (18) July 29.
- Rerouting a Traffic of Nine Cars a Minute.* H. C. Donecker. (17) July 29.
- Long Rides for a Nickel.* D. J. McGrath. (17) Aug. 5.
- Chicago's Congested Streets.* (17) Aug. 5.
- The William-Street Section of the New York Subway.* (12) Aug. 11.
- Boston Profits by Elevated Railway Station Improvements.* (17) Aug. 12.
- Keeping Mechanical Department Costs.* F. A. Miller. (17) Aug. 19.
- Vestibuling 560 Semi-Convertible Cars.* (17) Aug. 19.
- Rock-Tunneling Machine Using Pneumatic-Hammer Tools.* (13) Aug. 24.
- Elevated Railway of Domed Arch Construction a Strong Contrast to Steel Structure.* (14) Aug. 26.
- New Grooved Girder Rails.* (13) Aug. 31.
- Plexion des Rails de Tramway.* P. Caufourier. (33) Aug. 12.

Roads and Pavements.

- Improvements of Highways to Meet Modern Conditions of Traffic. W. H. Schofield. (114) July.
- The Destruction of a Macadam Road.* T. W. Arnall. (114) July.
- Standard Paving Block Specifications. (96) July 6.
- Macadam Road Maintenance. W. H. Huber. (Paper read before the Good Roads Congress.) (96) July 6.
- Roads and Paving. (11) Serial beginning July 14.
- Stone as a Road Material. James S. Wilson. (96) July 20.
- The Results Obtained in Street Cleansing by Motors. W. Greig. (Paper read before the Inst. of Cleansing Supts.) (104) July 21.
- Sioux City Concrete Pavements.* (13) July 27.
- The Fluxing of Asphalts. Francis Pitt Smith, M. Am. Soc. C. E. (96) July 27.
- Plank Roadway Laid Across Shifting Desert Sands, Road near Holtville, Cal.* (14) July 29.
- Road Direction Signs. C. H. Cooper. (114) Aug.
- Resistance of Concrete Roads to Wear.* (60) Aug.
- Some Comparative Tests of the Wearing Qualities of Paving Bricks, Concrete, Mortar and Neat Cement.* F. L. Roman. (60) Aug.
- Constructing Concrete Curbs.* (67) Aug.
- Earth Road Construction in Murray County, Minnesota.* (86) Aug. 2.
- Sand-Cement Bed and Mortar Bed in Illinois Brick Road Construction. (86) Aug. 2.
- Cost of Asphaltic Oil Treatments at Portland, Me. (86) Aug. 2.
- Wear of Concrete Pavement Due to Improper Construction. (86) Aug. 2.
- Standard Pavement Sections of Portland, Ore.* (86) Aug. 2.
- Methods and Costs of Oiling Earth Roads in Illinois.* (86) Aug. 2.
- Bituminous Materials Tests for Sheet Asphalt. Francis P. Smith. (13) Aug. 3.
- Road Drainage and Foundations. W. W. Crosby. (Paper read before the Canadian Road Congress.) (96) Aug. 3.
- Four Construction and Thirteen Maintenance Gangs Care for McLennan County's Roads.* William C. Davidson. (14) Aug. 5.
- Planning and Organizing for Paving County Roads.* (13) Aug. 10.
- Gravelled Roads. Gabriel Henry. (Paper read before the Canadian Good Roads Congress.) (96) Aug. 17.
- Thirty-Mile Macadam Automobile Road Built Through Maine Woods to Construct Dam.* (14) Aug. 19.
- Oiled Pavements Smoothed with Scarifier and Scraper.* (14) Aug. 19.
- Asphalt Pavement Costs with Municipal Plant. John W. Cunningham. (13) Aug. 24.
- Street Railway Track Construction in Paved Streets. R. Keith Compton. (Abstract of paper read before the Am. Road Builders' Assoc.) (96) Aug. 24.

Sanitation.

- The Little River Drainage District.* William A. O'Brien. (115) July.
- Pollution of Canadian Streams. (96) July 6.
- Bridgeburg Sewage Disinfection.* (96) July 6.
- Sheffield Sewage Disposal Works. John Haworth. (Paper read before the Assoc. of Mgrs. of Sewage Disposal Works.) (104) July 14.
- Sewage Purification Plant at Pont-y-Wal Breconshire.* (11) July 21.
- Power Drives for Ventilating Fan Operation.* H. Bard. (101) July 28.

* Illustrated.

Railroads, Street.

- Queens Boulevard Viaduct, New York Elevated Line*. Alfred M. Wyman. (18) July 22
- Cleveland Composites Two More Terminals*. (17) July 22
- Standard Layout Designs of the Brooklyn Rapid Transit System*. (17) July 22
- Study of Chicago's Congested Traffic. (17) July 22
- Portable Motor-Driven Hoisting Machine*. S. L. Foster. (17) July 22
- New Standard Types of Roadbed for Subways, Tunnels and Elevated Roads, New York City*. R. H. M. Canfield. (18) July 22
- Revolving a Traffic of Nine Cars a Minute*. H. C. Doneschke. (17) July 22
- Chicago's Congested Streets*. (17) Aug. 5
- The William-Street Section of the New York Subway*. (12) Aug. 11
- Boston Profile by Revised Railway Station Improvements*. (17) Aug. 12
- Keeping Mechanical Department Costs*. E. A. Miller. (17) Aug. 12
- Ventilating 800 Semi-Conversible Cars*. (17) Aug. 12
- Rock-Tunneling Machine Using Pneumatic-Hammer Tools*. (17) Aug. 24
- Elevated Railway of Dorned Arch Construction a Strong Contrast to Steel Structures*. (14) Aug. 26
- New Grooved Girder Rails*. (13) Aug. 21
- Reconstruction of the Rails of the Trestleway*. F. Cammermeyer. (23) Aug. 12

Roads and Pavements.

- Improvements of Highways to Meet Modern Conditions of Traffic. W. H. Schofield. (114) July
- The Destruction of a Macadam Road*. T. W. Arnall. (114) July
- Standard Paving Block Specifications. (96) July 6
- Macadam Road Maintenance. W. H. Huber. (Paper read before the Good Roads Congress). (96) July 6
- Roads and Paving. (11) Serial beginning July 14
- Stone as a Road Material. James S. Wilson. (96) July 20
- The Results Obtained in Street Cleaning by Motors. W. Greig. (Paper read before the Int. of Cleaning Societies). (104) July 21
- Stout City Concrete Pavements*. (13) July 27
- The Paving of Asphalt. Francis Pitt Smith, M. Am. Soc. C. E. (96) July 27
- Black Highway Laid Across Shifting Sands. Road near Holtville, Cal*. (14) July 29
- Road Division Signs. C. H. Cooper. (114) Aug.
- Resistance of Concrete Roads to Wear*. (96) Aug.
- Some Comparative Tests of the Wearing Qualities of Paving Bricks, Concrete, Mortar and Seal Concrete*. F. L. Roman. (96) Aug.
- Constructing Concrete Curb*. (97) Aug.
- Earth Road Construction in Murray County, Minnesota*. (86) Aug. 2
- Second-Cement Bed and Mortar Bed in Illinois Brick Road Construction. (86) Aug. 2
- Cost of Asphalt Oil Treatments at Portland, Me. (86) Aug. 2
- Wear of Concrete Pavement Due to Improper Construction. (86) Aug. 2
- Standard Pavement Sections of Portland Ore*. (86) Aug. 2
- Methods and Costs of Oiling Earth Roads in Illinois*. (86) Aug. 2
- Illinois Material Tests for their Asphalt. Francis P. Smith. (13) Aug. 3
- Road Drainage and Foundations. W. W. Crosby. (Paper read before the Canadian Road Congress). (96) Aug. 3
- Four Construction and Traffic Maintenance Grange Gate for McKean County's Roads*. William C. Davidson. (14) Aug. 3
- Gravelled Roads. Gabriel Henry. (Paper read before the Canadian Good Roads Congress). (96) Aug. 17
- Thirty-Mile Macadam Automobile Road Built Through Maine Woods to Construct Dam*. (14) Aug. 19
- Oiled Pavements Smoothed with Scarifier and Scraper*. (14) Aug. 19
- Asphalt Pavement Costs with Municipal Plans. John W. Cunningham. (13) Aug. 24
- Street Railway Track Construction in Paved Streets. R. Keith Campbell. (Abstract of paper read before the Am. Road Builders' Assoc.). (96) Aug. 24

Sanitation.

- The Little River Drainage District*. William A. O'Brien. (112) July
- Pollution of Canadian Streams. (96) July 6
- High-Speed Sewage Disinfection*. (96) July 6
- Methods of Sewage Disposal Works. John Haworth. (Paper read before the Assoc. of Sewage Disposal Works). (104) July 11
- Sewage Purification Plant at Port-V-Wal Wisconsin*. (11) July 21
- Power Drives for Ventilating Fan Operation*. H. Bird. (101) July 28

Sanitation—(Continued).

- Methods of Testing Warm Air Furnaces.* R. W. Davenport. (Paper read before the Am. Soc. Heating and Ventilating Engrs.) (101) July 28.
- Tests Show Activated-Sludge Process Adapted to Treatment of Stock-Yards Wastes. (14) July 29.
- Five Thousand Hogs Eat Denver's Garbage.* (14) July 29.
- Central-Station Heating Plant Operation in Milwaukee.* O. M. Rau. (27) July 29.
- Some Features of Domestic Electric Cooking and Heating.* H. B. Peirce. (42) Aug.
- How to Increase Factory Efficiency, Cleanliness and Comfort.* O. M. Becker. (9) Aug.
- Making the Steam Plant Adequate for Both Power and Heating. Charles L. Hubbard. (9) Aug.
- The Element of Chance in Sanitation.* George C. Whipple. (3) Aug.
- Methods of Concrete Sewer Construction.* J. F. Springer. (60) Aug.
- Testing Various Soils for Drainage Properties.* John R. Haswell. (13) Aug. 3.
- Hydrolytic Sewage Tanks at Luton, England.* J. W. Tomlinson. (13) Aug. 3.
- Mechanical Equipment in a New York School.* Frank G. McCann. (101) Serial beginning Aug. 4.
- Canalization of Half-Million Acre Drainage District Discloses Canal-Width Limits.* (14) Aug. 5.
- A Small Sewage Sprinkling Filter with Unique Features.* R. C. Hardman. (86) Aug. 9.
- The Cleaning Up and Improvement of a Stream Polluted by Sewage and Trade Wastes. Harrison P. Eddy. (86) Aug. 9.
- Sewer Cleaning Machine Used at Hammond, Ind.* (86) Aug. 9.
- Some Ideas in Sewer Work.* W. G. Cameron. (96) Aug. 10.
- Industrial Diseases of Iron and Steel Workers in Middlesbrough. J. Watkin Edwards. (22) Aug. 11.
- Sewage Disposal at Caerphilly.* (104) Aug. 11.
- The Effect of Temperature and Humidity; Results of Experiments. Frederic S. Lee. (Abstract from *American Journal of Physiology*.) (101) Aug. 11.
- Difficult Construction in Sewer Changes.* Paul G. Koch. (14) Aug. 12.
- Sewage-Treatment Plant, Cook County Institutions.* Burton J. Ashley. (13) Aug. 17.
- Analytical Study of Garbage Rubbish and Ashes. (13) Aug. 17.
- Making a Radiator Efficiency Test.* C. A. Fuller. (101) Aug. 18.
- Design and Operation of Fractional Valves.* James A. Donnelly. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) (101) Aug. 18.
- Perform all Work for Double-Deck Sewer from Five Mounted Platforms.* (14) Aug. 19.
- Some Results of Analyses of Garbage and Waste. (13) Aug. 24.
- Plumbing and Heating Systems in New Jail.* (101) Serial beginning Aug. 25.
- Electric Pumping Plant for Land Drainage. (13) Aug. 31.
- Long-Time New York Rainfall as Basis for Sewer Design.* O. Hufeland. (13) Serial beginning Aug. 31.
- Mill Creek Sewer Tunnel Alignment. R. C. Gans. (13) Aug. 31.

Structural.

- Service Tests of Treated and Untreated Fence Posts. Harlow Bradley. (85) July.
- Time Tests of Concrete. Franklin R. McMillan. (115) July.
- Penetration of Preservatives.* Lowry Smith. (113) July.
- A Pacific Coast Timber-Treating Plant.* H. E. Horrocks. (113) July.
- Effect of Sulphur in Rivet Steel.* J. S. Unger. (Abstract of paper read before the Am. Boiler Mfrs. Assoc.) (64) July 25.
- A Study of Effective Width of Reinforced Concrete Slabs. A. T. Goldbeck and E. B. Smith. (Abstract from *Journal of Agricultural Research*.) (86) July 26.
- An Economic Comparison of Reinforced Concrete and Mill Building Construction. (86) July 26.
- Method and Cost of Treating Sheet Piles Exposed to Sea Water with Avenarius Carbolineum.* W. D. Jones. (86) July 26.
- Cement Measuring Device for Varying Concrete Proportions.* W. D. Jones. (86) July 26.
- Some Notes on Pile Driving. L. G. Hall. (86) July 26.
- Methods and Cost of Making and Sinking Pre-Moulded Concrete Piles.* Geo. K. Leonard. (86) July 26.
- The Thickness of Flat Slab Floors. Henry T. Eddy. (86) July 26.
- Costs of Hospital Buildings. (86) July 26.
- A Concrete Mixing Plant 180 Ft. Above Chicago.* (86) July 26.
- Concrete in Dry Open Caisson Deposited by Tremie.* (13) July 27.
- Lagscrewed Joints in Timber.* H. D. Dewell. (13) July 27.
- To Find Graphically the Position of Unit Load Giving Zero Stress in any Web Member of a Girder.* John Edmondson. (11) July 28.
- Excavating Machines and Overhaul. G. B. Massey. (14) July 29.
- Timber Roof Coverings. Frederick W. Foote. (16) July 29.

* Illustrated.

Sanitation—(Continued).

- Methods of Testing Warm Air Furnaces, R. W. Davenport, (Paper read before the Am. Soc. Heating and Ventilating Eng'rs.) (101) July 23.
- Tests Show Activated-Sludge Process Adapted to Treatment of Stock-Yards Wastes (14) July 23.
- Five Thousand Horse-Power Gasworks, (14) July 23.
- Central-Station Heating Plant Operation in Milwaukee, O. M. Hoad, (27) July 23.
- Some Features of Domestic Electric Cooking and Heating, H. H. Pease, (42) Aug.
- How to Increase Factory Efficiency, Cleanliness and Comfort, O. M. Becker, (9) Aug.
- Making the Green Plant Adaptable for Heat-Tower and Heating, Charles A. Hubbard, (9) Aug.
- The Element of Change in Sanitation, George C. Whipple, (13) Aug.
- Method of Concrete Sewer Construction, J. F. Spencer, (60) Aug.
- Testing Various Soils for Drainage Properties, John H. Henshaw, (13) Aug. 3.
- Hydrostatic Sewage Tanks at Linton, England, J. W. Tomlinson, (13) Aug. 3.
- Mechanical Equipment in a New York School, Frank D. McGowan, (101) Serial beginning Aug. 1.
- Canalization of Half-Million Acres Drainage Through Concrete Canal-Width Limits, (14) Aug. 3.
- A Small Sewage-Spreading Filter with Unique Features, H. C. Hardman, (50) Aug. 3.
- The Cleaning Up and Improvement of a Stream Polluted by Sewage and Tides, Wastons, H. Eddy, (80) Aug. 3.
- Sewer Cleaning Machine Used at Hammond, Ind., (80) Aug. 3.
- Some Ideas in Sewer Work, W. G. Cameron, (60) Aug. 10.
- Industrial Discharges of Lime and Steel Wastes in Middleborough, J. W. White, (22) Aug. 11.
- Edwards, (22) Aug. 11.
- The Effect of Temperature and Humidity, Results of Experiments, Roberts, S. Lee, (Abstract from American Journal of Hygiene.) (101) Aug. 11.
- Hydraulic Connections in Sewer Systems, Part II, (14) Aug. 12.
- Sewer-Transmitting Plant, (See County Institutions.) (101) Aug. 12.
- Analysis of Sanitary Conditions and Aspects, (14) Aug. 17.
- Making a Sanitary Highway, Part I, A. Taylor, (101) Aug. 18.
- Design and Operation of Treatment Works, James A. Downey, (Paper read before the Am. Soc. of Heating and Ventilating Eng'rs.) (101) Aug. 18.
- Perform all Work for Double-Block Sewer from Two Manholes, (14) Aug. 18.
- Some Results of Analysis of Gasworks and Wastes, (13) Aug. 21.
- Pumping and Heating Systems in New York, (101) Serial beginning Aug. 22.
- Electric Pumping Plant for Land Drainage, (13) Aug. 21.
- Long-Term New York Sanitary as Basis for Sewer Design, O. Hulsland, (13) Serial beginning Aug. 21.
- Mill Creek Sewer Tunnel Arrangement, E. C. Goss, (13) Aug. 21.

Structural.

- Reinforced Tests of Treated and Untreated Frame Piers, Hatcher Hurdley, (85) July.
- Time Tests of Concrete, Franklin H. McMillan, (113) July.
- Penetration of Prestressing, Lewis Smith, (113) July.
- A Pacific Coast Timber-Pressing Plant, H. E. Hunsicker, (113) July.
- Effect of Sulphur in Blast Steel, J. S. Langer, (Abstract of paper read before the Am. Inst. Min. Assoc.) (94) July 23.
- A Study of Reinforced Concrete Slabs, A. T. Goldbeck and H. B. Smith, (Abstract from Journal of Experimental Mechanics.) (80) July 23.
- An Economic Comparison of Reinforced Concrete and Mild Building Construction, (80) July 23.
- Method and Cost of Treating Steel Pipes Exposed to Sea Water with Aqueous Carbolic Acid, W. D. James, (80) July 23.
- Current Measuring Device for Vapour Pressure, W. D. James, (80) July 23.
- Some Notes on the Design, A. C. Hall, (80) July 23.
- Methods and Cost of Making and Shaping Reinforced Concrete Piers, H. K. Leonard, (80) July 23.
- The Thickness of Flat Slab Floors, Henry T. Eddy, (80) July 23.
- Costs of Hospital Buildings, (80) July 23.
- A Concrete Slab for 150 ft. Span, (80) July 23.
- Concrete in Dry Open Canals, Designed by Francis, (13) July 23.
- Largest Laminar in Timber, H. D. Fowler, (13) July 23.
- The Find Graphically the Position of the Load, (13) July 23.
- Member of a Girder, John Hunsicker, (13) July 23.
- Excavating Machines and Overhaul, E. B. Mawney, (14) July 23.
- Timber Hoof Construction, Frederick W. Paine, (10) July 23.

* Illustrated.

Structural—(Continued).

- Economical Precast Stairway Design Developed for Panama Canal Lighthouse.*
Walter F. Beyer. (14) July 29.
- Long Move for 800-Ton Residence.* (14) July 29.
- Qualities Required of Concrete to Resist Action of Sea Water. W. Walters Pagon.
(Abstract from *Journal, Engrs. Club of Baltimore*.) (16) July 29.
- Gravel Aggregate for Concrete.* W. K. Hatt. (67) Aug.
- Practical Methods for Testing Fire Brick.* C. E. Nesbit and M. L. Bell. (116)
Aug.
- The Cumberland Method of Preventing Corrosion.* Elliott Cumberland. (Paper
read before the Inst. of Metals.) (64) Aug. 1.
- Appearance of Quaking, Mushy and Fluid Concrete.* (86) Aug. 2.
- Mechanical Handling of Asphalt.* S. G. Talman. (96) Aug. 3.
- A New Sheet Piling.* (96) Aug. 3.
- The "Growth" of Internal Combustion Engine Cylinders.* J. E. Hurst. (11)
Aug. 4.
- Building-Foundation Specialists use Sectional Forms.* (14) Aug. 5.
- Improved Arrangement Doubles Production of Concrete-Casting Plant.* (14)
Aug. 5.
- Pneumatic Placing Saves Space in Concreting Retaining Wall. D. S. Studdiford.
(14) Aug. 5.
- Hydrated-Lime Mortar Increases Strength of Brick Piers. (14) Aug. 5.
- World's Reinforced-Concrete Construction Record Claimed for Frame of Philadelphia
Factory.* (14) Aug. 5.
- Brick Chimney Strengthened by Reinforced Concrete.* Ernest McCullough. (14)
Aug. 5.
- Efficiency of Unsymmetrical Riveted Joints.* R. N. Blackburn. (64) Aug. 8.
- Flat-Slab Floor Failure due to Poor Brick Wall Columns.* (13) Aug. 10.
- Central Concrete-Mixing Plant Tried at Baltimore.* G. Y. Carpenter. (13)
Aug. 10.
- Unit Stresses for Timber; Manufacturers' Table. (13) Aug. 10.
- Special Strain Gage has One-Piece Welded Frame.* (14) Aug. 12.
- Dynamite Proves Effective in Wrecking of Panama-Pacific Exposition.* (14)
Aug. 12.
- Interesting Concrete Plants Illustrate Modern Methods.* (14) Aug. 12.
- Cylinder Pier Foundations Laid Inside Sheetpile Wells.* C. S. Boardman. (13)
Aug. 17.
- Longest Span Slab Used in Chicago Hospital.* J. Norman Jensen. (14) Aug. 19.
- The Capacities of Chimneys.* George A. Orrok. (64) Aug. 22.
- Methods and Cost of Constructing a Reinforced Concrete Storehouse. E. R. Gayles.
(Abstract from *Public Works of the Navy*.) (86) Aug. 23.
- Heat Transmission Through Glass as Used in Building Construction.* John R. Allen.
(Abstract from paper read before the Am. Soc. of Heating and Ventilating
Engrs.) (86) Aug. 23.
- Practical Closure Sheet for Single Wall Steel Sheet Pile Cofferdams.* Carl O.
Johnson. (86) Aug. 23.
- Apparatus and Methods Used in Measuring the Vibrations in a Building.* P. E.
Stevens. (Abstract from *Bulletin, Civ. Engrs. Soc. of St. Paul*.) (86) Aug. 23.
- Constructing Pile Foundation in Hard Gravel.* Smith O. Steere. (13) Aug. 24.
- Structural Design of a Peaked Reinforced-Concrete Roof.* J. Norman Jensen.
(13) Aug. 24.
- Sinking a Shaft by Dredging Through Springs and Gas.* (13) Aug. 24.
- A New Type of Concrete Coaling Station.* (15) Aug. 25.
- Estimating Quantities in Sheet Metal Work.* (101) Aug. 25.
- Timbers of the Philippines. (19) Aug. 26.
- Diagrams for Cost of Placing Steel Reinforcement. Dan Patch. (14) Aug. 26.
- Long-Span Concrete Arched Bents Support Roof of Chicago Hebrew Institute.* (14)
Aug. 26.
- Properties of Iron and Steel Wires and Cables.* Clem A. Copeland. (111) Serial
beginning Aug. 26.
- Sand Sluiced Around Field Museum Columns, Chicago, Holds them for More Fill
by Conveyors.* (14) Aug. 26.
- Calcium Chloride Hastens Seasoning of Concrete.* (14) Aug. 26.
- A Simple and Efficient Cost Keeping System for Concrete Construction. (86)
Aug. 30.
- Pneumatic Concreting and its Development. J. H. Graham. (13) Aug. 31.
- Tons of Coal a Bin will Hold.* W. F. Schaphorst. (83) Sept. 1.
- Le Frettage dans les Travées Infiéchies. Goupil. (43) Nov., 1915.
- La Cohésion Intercristalline des Métaux. W. Rosenhain et D. Ewen. (From
Inst. of Metals.) (93) Dec., 1915.
- Nouvelles Instructions allemandes Relatives au Calcul du Béton Armé. C. Lemaire.
(33) July 22.
- Durchleuchtung von armiertem Beton mit Röntgenstrahlen.* E. Stettler. (107)
July 8.
- Statische Untersuchung durchbrochener Wandträger in Eisenbeton.* S. Kasarnowsky.
(107) Aug. 5.

* Illustrated.

Structural—(Continued).

- Mechanical Tension Straps Designed for Panama Canal Lighthouse*,
 Walter F. Meyer. (14) July 23.
 Long May for 800-Ton Lighthouse*, (14) July 23.
 Quantities Required of Concrete to Resist Action of Sea Waves, W. Walters Pagan.
 (Abstract from Journal, Bureau of Hydraulics, (110) July 23.
 Concrete from Journal, Bureau of Hydraulics, (110) July 23.
 Concrete from Journal, Bureau of Hydraulics, (110) July 23.
 Practical Methods for Testing Fire Brick*, C. R. Needell and M. L. Bell. (110)
 Aug.
 The Combined Method of Preventing Corrosion*, Elliott Cumberland. Paper
 read before the Inst. of Metals. (105) Aug. 1.
 Appearance of Quenched Heavy and Thin Castings*, (105) Aug. 2.
 Mechanical Treatment of Asphalt*, E. G. Talmann. (105) Aug. 2.
 The "Growth" of Internal Compression Regions in Castings*, J. E. Hume. (111)
 Aug. 4.
 Building-Foundation Specifications and Sectional Forms*, (114) Aug. 5.
 Improved Arrangement for Position of Foundation-Setting Planes*, (114)
 Aug. 5.
 Pneumatic Placing Space in Connection with Wall, D. S. Houghston.
 (114) Aug. 5.
 Hydraulic-Lime Mortar Increases Strength of Brick Piers. (114) Aug. 5.
 World's Reinforced-Concrete Convention Record Obtained for Terms of Philadelphia
 Fair*, (114) Aug. 5.
 Brick Chimney Strengthened by Reinforced Concrete*, Ernest McCullough. (114)
 Aug. 5.
 Efficiency of Unsymmetrical Riveted Joints*, R. N. Hinchman. (104) Aug. 5.
 Flat-Base Floor Joists due to Foot Brick Wall Columns*, (115) Aug. 10.
 Concrete-Mixing Plant Tried at Baltimore*, G. Y. Carpenter. (115)
 Aug. 10.
 Unit Stresses for Timber; Manufacturers' Table. (115) Aug. 10.
 Special Strain Gage has One-Piece Welded Frame*, (114) Aug. 12.
 Dynamic Prover Effective in Working of Panama-Pacific Exposition*, (114)
 Aug. 12.
 Reinforced Concrete Plans Illustrate Modern Methods*, (114) Aug. 12.
 Cylinder for Foundation Laid Inside Steelpile Wall*, C. R. Houghston. (115)
 Aug. 12.
 Longest Span Steel Used in Chicago Hospital*, J. Norman Jensen. (114) Aug. 12.
 The Capacity of Chimneys*, George A. Carter. (104) Aug. 22.
 Methods and Cost of Constructing a Reinforced Concrete Warehouse, R. R. Gayles.
 (Abstract from Journal, Bureau of Hydraulics, (105) Aug. 22.
 Heat Transmission Through Glass as Used in Building Construction*, John R. Allen.
 (Abstract from paper read before the Am. Soc. of Heating and Ventilating
 Engineers.) (105) Aug. 22.
 Practical Concrete Sheet for Single Wall Steel Sheet Pile Cores*, Carl O.
 Johnson. (105) Aug. 22.
 Apparatus and Methods Used in Measuring the Vibrations in a Building*, F. H.
 Stevens. (Abstract from Bulletin, Civ. Engrs. Soc. of St. Paul.) (105) Aug. 22.
 Construction of the Foundation in Hard Gravel*, Smith O. Stevens. (115) Aug. 22.
 Structural Design of a Reinforced-Concrete Roof*, J. Norman Jensen.
 (115) Aug. 22.
 Shaking a Shell by Loading Through Springs and Gaps*, (115) Aug. 22.
 A New Type of Concrete Contour Station*, (115) Aug. 22.
 Reinforcing Quantities in Steel Metal Work*, (101) Aug. 22.
 Timbers of the Philippines. (107) Aug. 22.
 Diagrams for Cost of Placing Steel Reinforcement, Dan Patrick. (114) Aug. 22.
 Long-Span Concrete Arch Bridge Support Root of Chicago Hebrew Institute*, (114)
 Aug. 22.
 Properties of Iron and Steel Wires and Cables*, Clem A. Copeland. (111) Serial
 published Aug. 22.
 Sand Blasted Around Field Masonry Columns, Chicago, Holds them for More Will
 by Concrete*, (114) Aug. 22.
 Calcium Chloride Hastens Seasoning of Concrete*, (114) Aug. 22.
 A Simple and Effective Gas Heating System for Concrete Construction. (105)
 Aug. 22.
 Pneumatic Concrete and its Development, J. H. Graham. (115) Aug. 22.
 Tools of Cost a Bit with Hold*, W. F. Schepers. (103) Sept. 1.
 The Friction of the Tires of Automobiles, G. H. Gault. (143) Nov. 1915.
 The Concrete Investigation of the Material, W. Rosenblatt and D. Egan. (From
 Inst. of Metals.) (103) Dec. 1915.
 Nonvertical Interference of Reinforced Concrete as Calculated by the Method of
 (115) July 22.
 Durchschneidung von Stahlbeton mit Hölzern, H. Stettin. (107)
 July 8.
 Statistische Untersuchung der Verhältnisse der Eisenbeton*, S. Krasnowsky.
 (107) Aug. 5.

* Illustrated.

Topographical.

- Specifications and Unit Costs for an Extensive Topographical Survey. Henry Fox. (115) July.
 Methods and Cost of Reproducing and Reducing Engineering Drawings. J. X. Cohen. (86) Aug. 30.

Water Supply.

- The Wilson Avenue Water Tunnel, Chicago.* H. W. Clausen. (4) May.
 The Middleboro, Mass., Reinforced Concrete Water Tower Tank.* George A. Sampson. (28) June.
 Some Water-Works Experiences in Hartford, Conn.* Caleb Mills Saville. (28) June.
 Plans and Records of Water Distribution Systems.* William P. Walker. (Paper read before the Inst. of Water Engrs.) (104) June 30; (96) Aug. 10.
 The Alignment Diagram Applied to the Flow of Water in Uniform and Compound Mains.* D. Halton Thompson. (Paper read before the Inst. of Water Engrs.) (104) June 30; (66) Aug. 1.
 Mechanical Water Filtration Plant at Lancaster. Arthur G. Bradshaw. (104) July 7.
 Pumping Machinery Test Duty vs. Operating Results. J. N. Chester. (Paper read before the Am. Water Works Assoc.) (64) July 11.
 The Swedish State Hydro-Electric Power-Station at Alfkärleby.* (11) Serial beginning July 14.
 Progress upon the Hetch Hetchy Project.* Robert Sibley. (111) July 22.
 Pumps for the Irrigation of Small Areas.* Barry Dibble. (111) July 22.
 Pumping Plant for Small Irrigation Projects.* (64) July 25.
 Siphon-Operated Hydraulic Ram of Long Standing.* H. S. Palmer. (13) July 27.
 Phenomenal Rains the Cause of Southern Floods.* (13) July 27.
 Cleveland Filter Roof Collapse under Investigation.* (13) July 27.
 Power Plants and Factories Moved at Seneca Falls.* (13) July 27.
 Automatic Control of 75 Kva Hydro-electric Plant. D. R. Shearer. (27) July 29.
 Preparing Land for Flooding Methods of Irrigation with Small Heads.* (111) July 29.
 Setting Water Meters at Terre Haute, Ind. Jay A. Cravens. (60) Aug.
 Water Treatment on the Missouri Pacific.* (25) Aug.
 The Niagara Falls Power Famine. (105) Aug. 1.
 Couteau Power Company Development.* (96) Aug. 3.
 Overtopped Earth Dam Falls.* (13) Aug. 3.
 Two New Dams Proposed for San Diego Water-Supply. (13) Aug. 3.
 New Standard Irrigation Weir.* (From *Journal of Agricultural Research.*) (13) Aug. 3.
 Slow Rate of Utilization of Irrigation Works. R. P. Teele. (13) Aug. 3.
 Tunnel Grouting in Brooklyn End of Catskill Aqueduct.* O'Kelly W. Myers. (13) Aug. 3.
 Power Development in Saskatchewan. E. Hanson. (96) Aug. 3.
 Pumping 7 500 000 Gallons Daily by Air Lift.* (13) Aug. 3.
 Water Supply Equipment of Ocean-Going Craft. (101) Serial beginning Aug. 4.
 Water Waste. C. R. Knowles. (23) Aug. 4.
 Construction of Irrigation Checks.* (111) Aug. 5.
 Spacing Diagram for Hoop Reinforcing for Reinforced Concrete Standpipes.* Frank H. Carter. (86) Aug. 9.
 A Preliminary Report upon Purification of Swimming Pools of the State University of Iowa.* Jack J. Hinman, Jr. (86) Aug. 9.
 A \$4 000 000 Water Supply Development for Seattle, Wash. (86) Aug. 9.
 Cost of Structures of the Second Unit of the Dodson North Canal, Milk River Irrigation Project, Malta, Mont. A. E. Bechtel. (86) Serial beginning Aug. 9.
 Tests Showing High Air Lift Pump Efficiency. (86) Aug. 9.
 The Greater Winnipeg Water Supply.* (96) Aug. 10.
 Compensation in Kind Involved in Hartford Water Case. Caleb Mills Saville. (13) Aug. 10.
 Flow of Water into Wells; Approximate Theory.* N. Werenskiold. (13) Aug. 10.
 Final Report on the Columbia River Power Project. (111) Aug. 12.
 Concrete Water Tunnel Lining at Chicago.* (16) Aug. 12.
 Arched Gravity Dams to be Built at Lower Otay and Barrett Sites.* (14) Aug. 12.
 Pumping Plants for Rice Irrigation.* C. F. Adams. (111) Aug. 12.
 Ultra-Violet Ray Purifies Water at Cement Plant.* (14) Aug. 12.
 The Principles of Filtration.* D. R. Sperry. (105) Aug. 15.
 Venturi Meters Inaccurate on Lively Lines. Allen Hazen. (13) Aug. 17.
 Spaulding Dam to be Raised from 225 to 260 Ft.* F. G. Mudgett. (13) Aug. 17.
 Water Flow Increases with Rising Temperature.* W. L. Butcher. (13) Aug. 17.
 Deep-Well Pumping Plant at the Leatherseller's Hall.* (12) Aug. 18.
 The Coolgardie and Kalgoorlie Pipe Line. (12) Aug. 18.

* Illustrated.

- Hydrological.**
 Hydrographs and Flow Data for an Extensive Hydrological Survey. Harry Fox. (115) July.
 Methods and Cost of Hydrographic and Hydrological Engineering. J. V. Cohen. (116) Aug. 20.
- Water Supply.**
 The Wilson Avenue Water Tunnel. Chicago. H. W. Johnson. (117) Mar.
 The Washington Water Tunnel. Washington. George A. Johnson. (118) June.
 Some Water Works Experiments in Hartford, Conn. Caleb Mills Saville. (119) June.
 Plans and Details of Water Distribution Systems. William E. Walker. Paper read before the Inst. of Water Engrs. (120) June 22. Vol. 10.
 The Agreement Relating to the Flow of Water in Ontario and Commonwealth of Massachusetts. Paper read before the Inst. of Water Engrs. (121) June 22. Vol. 10.
 Mechanical Water Filtration Plant at Lancaster, Mass. G. H. Shaw. (122) July 7.
 Pumping Machinery Test Data on Operating Records. J. M. Chubb. Paper read before the Am. Water Works Assoc. (123) July 11.
 The New York State Water-Station at Albany. (124) July 11.
 Progress upon the New York State Water-Station at Albany. (125) July 22.
 Pumping Plant for the Irrigation of South Africa. Harry D. Smith. (126) July 22.
 Pumping Plant for the Irrigation of South Africa. (127) July 22.
 Pumping Plant for the Irrigation of South Africa. (128) July 22.
 Pumping Plant for the Irrigation of South Africa. (129) July 22.
 Pumping Plant for the Irrigation of South Africa. (130) July 22.
 Pumping Plant for the Irrigation of South Africa. (131) July 22.
 Pumping Plant for the Irrigation of South Africa. (132) July 22.
 Pumping Plant for the Irrigation of South Africa. (133) July 22.
 Pumping Plant for the Irrigation of South Africa. (134) July 22.
 Pumping Plant for the Irrigation of South Africa. (135) July 22.
 Pumping Plant for the Irrigation of South Africa. (136) July 22.
 Pumping Plant for the Irrigation of South Africa. (137) July 22.
 Pumping Plant for the Irrigation of South Africa. (138) July 22.
 Pumping Plant for the Irrigation of South Africa. (139) July 22.
 Pumping Plant for the Irrigation of South Africa. (140) July 22.
 Pumping Plant for the Irrigation of South Africa. (141) July 22.
 Pumping Plant for the Irrigation of South Africa. (142) July 22.
 Pumping Plant for the Irrigation of South Africa. (143) July 22.
 Pumping Plant for the Irrigation of South Africa. (144) July 22.
 Pumping Plant for the Irrigation of South Africa. (145) July 22.
 Pumping Plant for the Irrigation of South Africa. (146) July 22.
 Pumping Plant for the Irrigation of South Africa. (147) July 22.
 Pumping Plant for the Irrigation of South Africa. (148) July 22.
 Pumping Plant for the Irrigation of South Africa. (149) July 22.
 Pumping Plant for the Irrigation of South Africa. (150) July 22.
 Pumping Plant for the Irrigation of South Africa. (151) July 22.
 Pumping Plant for the Irrigation of South Africa. (152) July 22.
 Pumping Plant for the Irrigation of South Africa. (153) July 22.
 Pumping Plant for the Irrigation of South Africa. (154) July 22.
 Pumping Plant for the Irrigation of South Africa. (155) July 22.
 Pumping Plant for the Irrigation of South Africa. (156) July 22.
 Pumping Plant for the Irrigation of South Africa. (157) July 22.
 Pumping Plant for the Irrigation of South Africa. (158) July 22.
 Pumping Plant for the Irrigation of South Africa. (159) July 22.
 Pumping Plant for the Irrigation of South Africa. (160) July 22.
 Pumping Plant for the Irrigation of South Africa. (161) July 22.
 Pumping Plant for the Irrigation of South Africa. (162) July 22.
 Pumping Plant for the Irrigation of South Africa. (163) July 22.
 Pumping Plant for the Irrigation of South Africa. (164) July 22.
 Pumping Plant for the Irrigation of South Africa. (165) July 22.
 Pumping Plant for the Irrigation of South Africa. (166) July 22.
 Pumping Plant for the Irrigation of South Africa. (167) July 22.
 Pumping Plant for the Irrigation of South Africa. (168) July 22.
 Pumping Plant for the Irrigation of South Africa. (169) July 22.
 Pumping Plant for the Irrigation of South Africa. (170) July 22.
 Pumping Plant for the Irrigation of South Africa. (171) July 22.
 Pumping Plant for the Irrigation of South Africa. (172) July 22.
 Pumping Plant for the Irrigation of South Africa. (173) July 22.
 Pumping Plant for the Irrigation of South Africa. (174) July 22.
 Pumping Plant for the Irrigation of South Africa. (175) July 22.
 Pumping Plant for the Irrigation of South Africa. (176) July 22.
 Pumping Plant for the Irrigation of South Africa. (177) July 22.
 Pumping Plant for the Irrigation of South Africa. (178) July 22.
 Pumping Plant for the Irrigation of South Africa. (179) July 22.
 Pumping Plant for the Irrigation of South Africa. (180) July 22.
 Pumping Plant for the Irrigation of South Africa. (181) July 22.
 Pumping Plant for the Irrigation of South Africa. (182) July 22.
 Pumping Plant for the Irrigation of South Africa. (183) July 22.
 Pumping Plant for the Irrigation of South Africa. (184) July 22.
 Pumping Plant for the Irrigation of South Africa. (185) July 22.
 Pumping Plant for the Irrigation of South Africa. (186) July 22.
 Pumping Plant for the Irrigation of South Africa. (187) July 22.
 Pumping Plant for the Irrigation of South Africa. (188) July 22.
 Pumping Plant for the Irrigation of South Africa. (189) July 22.
 Pumping Plant for the Irrigation of South Africa. (190) July 22.
 Pumping Plant for the Irrigation of South Africa. (191) July 22.
 Pumping Plant for the Irrigation of South Africa. (192) July 22.
 Pumping Plant for the Irrigation of South Africa. (193) July 22.
 Pumping Plant for the Irrigation of South Africa. (194) July 22.
 Pumping Plant for the Irrigation of South Africa. (195) July 22.
 Pumping Plant for the Irrigation of South Africa. (196) July 22.
 Pumping Plant for the Irrigation of South Africa. (197) July 22.
 Pumping Plant for the Irrigation of South Africa. (198) July 22.
 Pumping Plant for the Irrigation of South Africa. (199) July 22.
 Pumping Plant for the Irrigation of South Africa. (200) July 22.

Water Supply—(Continued).

- Three Million Yards Being Pumped to Build Calaveras Dam, 240 Feet High by Hydraulic Method.* G. A. Elliott. (14) Aug. 19.
- Combine Waterworks Intake and Pumping Station for Standard Oil Refinery.* (14) Aug. 19.
- Would Silt Cedar River Reservoir with Clay and Place Asphaltic Lining. (14) Aug. 19.
- Underground Waters. (111) Aug. 19.
- The Iron-Bacteria.* David Ellis. (19) Serial beginning Aug. 19.
- Water Power Possibilities of Nova Scotia.* K. H. Smith. (96) Aug. 24.
- Mass Diagram for Power and Water-Supply Computations.* W. L. Butcher. (13) Aug. 24.
- Why American Water Pipes are Best.* Percy G. Donald. (20) Aug. 24.
- Upstream Face of a Rockfill Dam Sealed with a Sliding Concrete Apron.* (14) Aug. 26.
- Data on Electric Water-Supply Pumping for Thirty-Seven Iowa Communities. (27) Aug. 26.
- Comparison Between Steam and Water Power. H. W. Buck. (82) Aug. 26.
- An Air Lift Pumping Plant. (111) Aug. 26.
- Data Pertaining to Water. G. C. Long. (64) Aug. 29.
- Methods and Cost of Making a Snow Survey for Irrigation System. F. T. Cummings. (86) Aug. 30.
- Earth Dam with Sheet-Steel Diaphragm and Cutoff.* (13) Aug. 31.
- Experiments on Water Flow through Pipe Orifices.* Horace Judd. (55) Sept.
- Comparative Water Service Costs. (15) Sept. 1.
- Courbe Cycloïdale de Distribution des Vitesses dans les Tuyaux.* M. Mounié. (43) Nov., 1915.
- Commission des Filetages, Compte Rendu.* (92) May.
- Die Kraftwerke der Schweiz. Bundesbahnen am Gotthard.* (107) Serial beginning July 22.

Waterways.

- Lake of the Woods Levels and Outflow.* (96) Serial beginning July 6.
- Concreting Small Piers for Boat House Using Tremie.* Kirby Smith. (Abstract from *Public Works of the Navy*.) (86) July 26.
- Hydraulic-Fill and Wheeled-Scrapers for Levees.* (13) July 27.
- Device Maps Route of Boat in Sounding Operations.* (14) July 29.
- Three-Hinged Arches and Curved Cantilever Roof Trusses Used in Recreation Building.* (14) July 29.
- Water-Evaporation Studies by Weather Bureau.* Benjamin C. Kadel and Cleveland Abbe, Jr. (13) Aug. 3.
- European and American Tidewater Coal Docks.* J. F. Springer. (15) Aug. 4.
- Registering Hydrometer for Great Depths.* (14) Aug. 5.
- "Cat and Kitten" Holes in Outlet of Dam Control High and Low Flood Discharges.* (14) Aug. 5.
- Special Mechanical Devices Needed at Small Wharves.* J. W. Swaren. (14) Aug. 5.
- Reinforced-Concrete Ore Dock at Ashland, Wis.* W. E. King. (13) Aug. 10; (15) Aug. 11.
- New Harbor Basin at Copenhagen Formed by Long Caissons Floated to Place.* O. Blume. (14) Aug. 12.
- Protecting a Beach Highway from the Sea.* (14) Aug. 12.
- Navigability of Columbia and Snake Rivers Above Celilo. J. J. Morrow. (111) Aug. 12.
- Million-Dollar Project, Just Started, will Remove Flood Menace at Erie, Pa. Farley Gannett. (14) Aug. 19.
- River Diversion and Flood Control in Missouri.* (13) Aug. 24.
- New Buffalo, Rochester & Pittsburgh Dock at Buffalo.* (15) Sept. 1.
- Le Canal de Marseille au Rhone, son Utilité, la Navigation sur le Rhône.* A. Dumas. (33) July 8.
- Die Fliess-Wirbel.* Th. Rümelin. (107) July 15.

* Illustrated.